July 30, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

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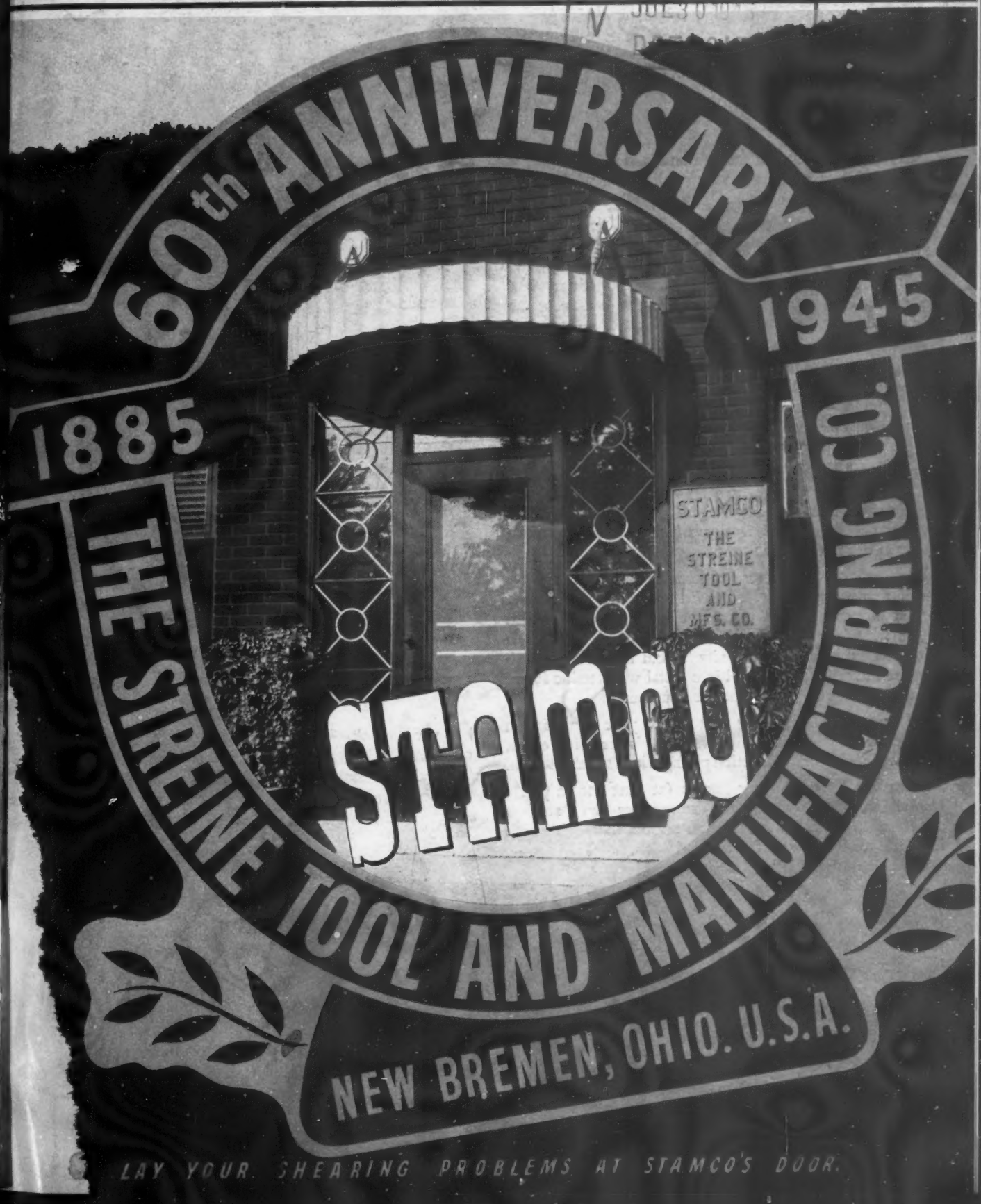
JUL 30



[PUMP TIPS FROM ALLIS-CHALMERS—ONE IN A SERIES]

How to make IMPELLERS Last Longer . . .

CLEARANCES between moving and stationary parts in a centrifugal pump are very small. And when pump and its driving motor are not correctly aligned or weight of piping puts undue strain on casing, every revolution of the shaft throws tremendous extra load and extra wear on all moving parts.

In the case of pumps designed with wearing rings which are attached to the casing, misalignment causes greatly accelerated wear on both rings and impeller — reducing the effective life of both.

In an effort to eliminate the misalignment problem, A-C engineers developed, for many applications, the "Electrifugal" pump — in which *both* impeller and motor are mounted on *one* shaft and in *one* frame. In such a pump the elements cannot get out of line. Result: wear on all moving parts is greatly reduced.

Besides misalignment, there are still other factors contributing to impeller wear. Regardless of type of pumps you have, here are a few tips which can help you get longer life out of impellers . . .

▸ An often overlooked cause of impeller wear is cavitation. For if pump capacity, speed, head and suction lift aren't figured properly, cavitation can eat an impeller away fast. Here's what happens: Rapid movement of impeller blade through liquid produces a cavity behind blade; local high pressure increase drives liquid into metal with terrific force! Moral: Be sure head is right for your pump.

▸ If foreign matter is being sucked into your pump it can clog or wear impeller unduly. Where this condition exists, provide the intake end of suction piping with a suitable screen.

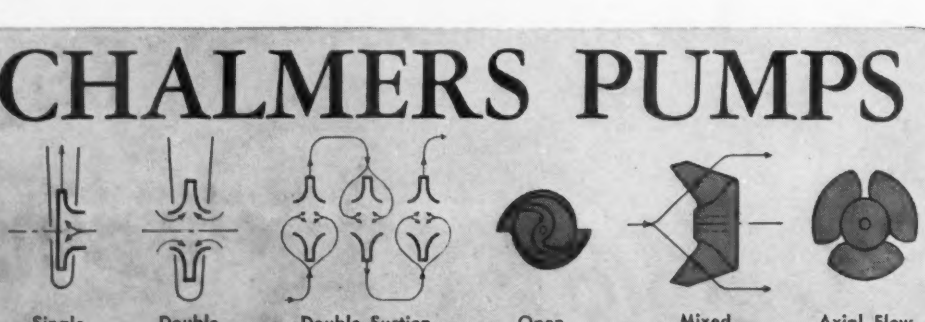
▸ When you dismantle your pumps (at least once a year), inspect impellers. If they are damaged or blade sections are corroded replace them, but *first* make a thorough search into the possible *causes* for the condition.

Impellers for Allis-Chalmers "Electrifugal" pumps are supplied in bronze, stainless steel, monel metal or other materials — depending upon the *exact nature* of the liquid to be pumped.

▸ If you haven't already done so, send for your *free* copy of "Handbook for Wartime Care of Centrifugal Pumps". This valuable booklet is packed with worthwhile information. Applies to *all* makes of pumps; contains *no* advertising. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 1688

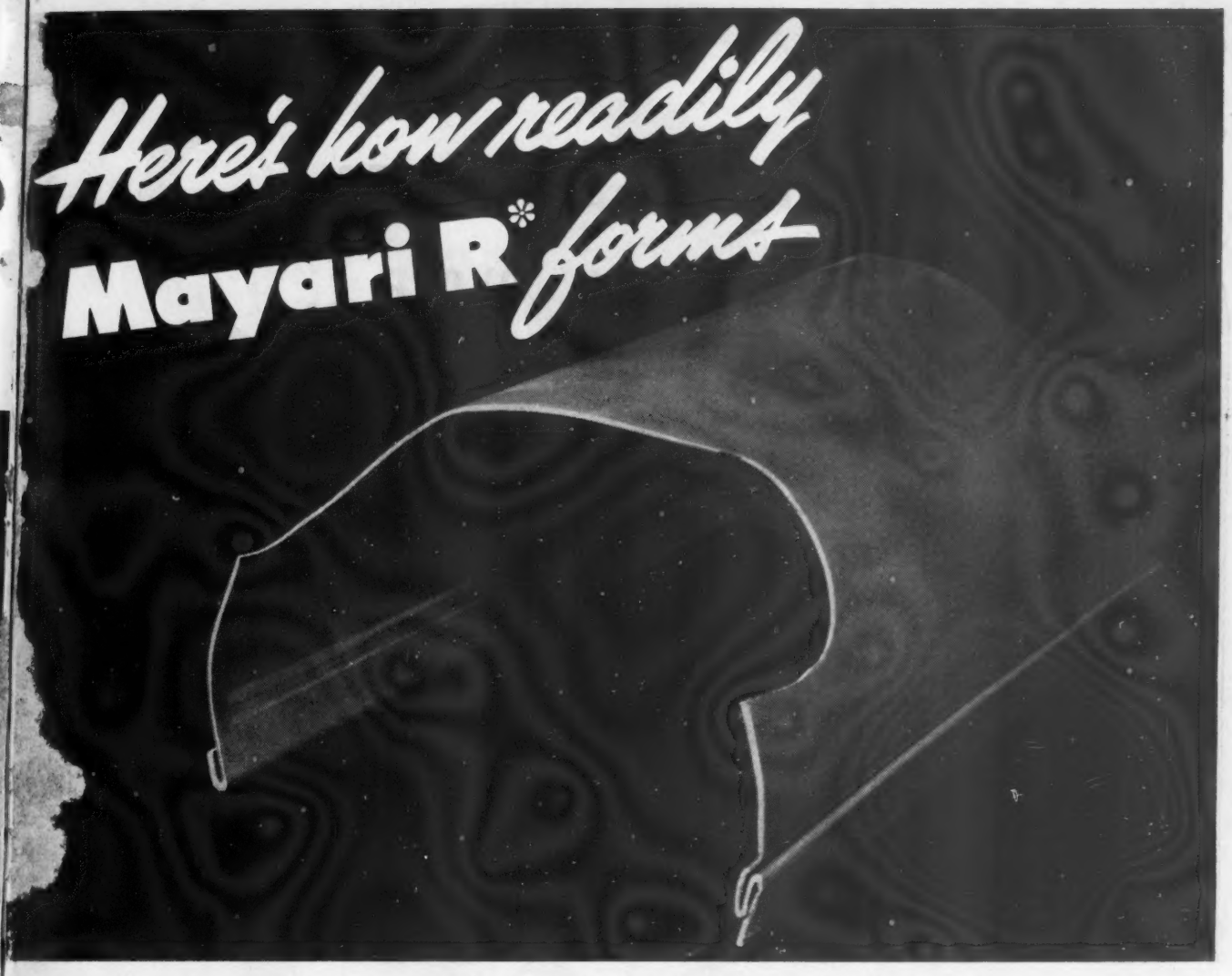
ALLIS-CHALMERS PUMPS

Allis-Chalmers builds all types and variations of pumps shown at right. Capacities from 10 to 150,000 gpm—heads to 2500 lbs.



Single Suction | Double Suction | Double Suction Multi-Stage | Open Impeller | Mixed Flow | Axial Flow (Propeller)

Here's how readily Mayari R* forms



*"Mayari" rhymes with "fiery." The "R" is for "Rust Resisting." Mayari, in Cuba, was the source of the original natural alloy-bearing Mayari ore.

The illustration shows a test sample of Mayari R, Bethlehem's low-alloy, high-strength steel. Working of the sample was done by a concern that handles a great variety of forming and fabricating work, and wanted to give Mayari R a thorough trial. Here's the verdict:

"This sample was sheared, run through a Pittsburgh Lock Seaming Machine, edged, flattened and rolled. In all these operations, the material worked easily, and showed no signs of breaking down.

*"We believe that we can find many uses for Mayari R in products we make."***

That gives you an idea of how readily sheets of Mayari R are formed. It also comes in strip, plates, bars and shapes, and in all forms it is readily fabricated under ordinary shop practices. It welds exceptionally well, too, by all the usual methods—and does not tend to air-harden, hence needs no heat treatment. With Mayari R, then, you have shop costs comparable to those with mild carbon steel.

Its workability, combined with its superior strength and corrosion-resistance, makes Mayari R well worth thinking about for your postwar products. With a yield point nearly twice that of mild carbon steel, Mayari R makes possible stronger construction with lighter sections—possible reductions in deadweight up to 40 per cent. And you get high resistance to atmospheric corrosion—five to six times that of mild carbon, and two to four times that of copper-bearing steel.

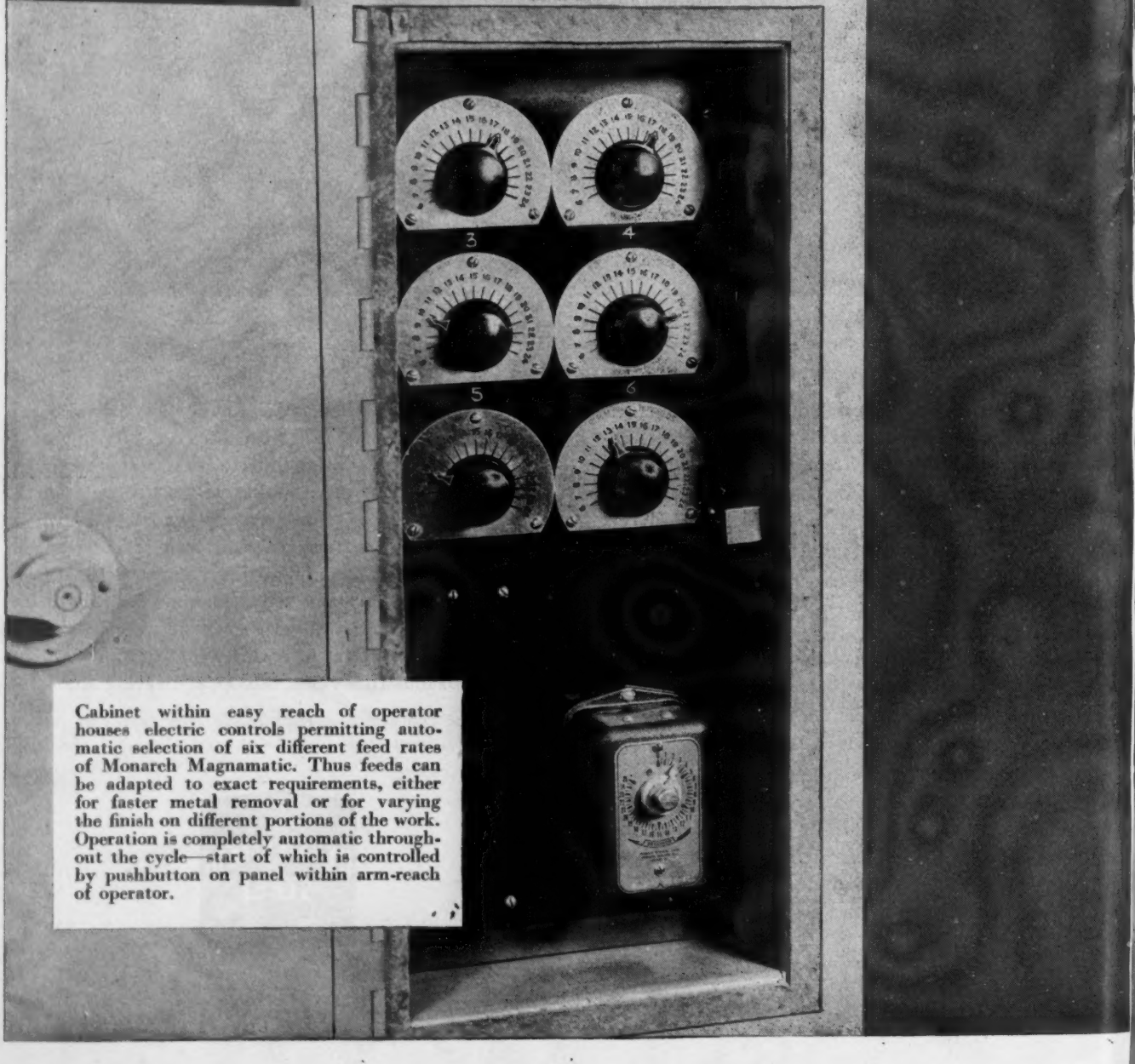
***Name of the concern that made this test and report supplied on request.*

★ BETHLEHEM STEEL ★

Mayari R *makes it lighter... stronger... longer lasting*

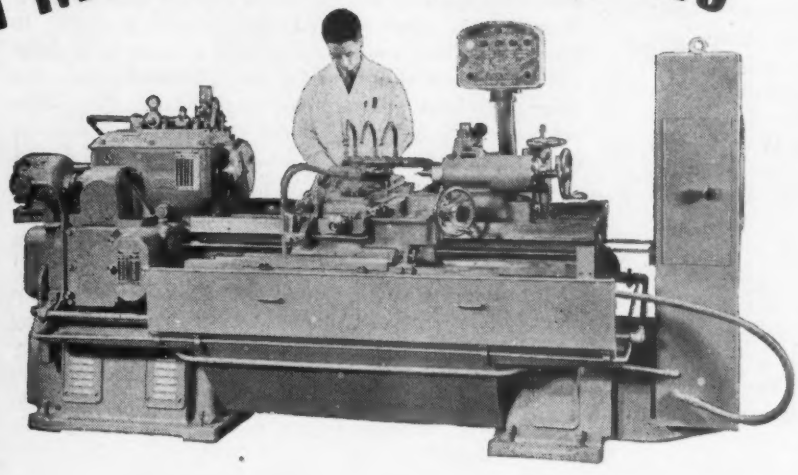
6 DIFFERENT FEED RATES ON 1 AUTOMATIC CYCLE...

6 help remove metal faster on



Cabinet within easy reach of operator houses electric controls permitting automatic selection of six different feed rates of Monarch Magnamatic. Thus feeds can be adapted to exact requirements, either for faster metal removal or for varying the finish on different portions of the work. Operation is completely automatic throughout the cycle—start of which is controlled by pushbutton on panel within arm-reach of operator.

on Monarch Magnamatic



This feature alone makes the Magnamatic a profitable investment for a wide variety of automatic turning, boring or facing work. Add to it the advantages of exceptionally fast setup (as described at right) and you can see why Magnamatics have been so successful in peace and war production over the past ten years.

For runs as short as 25 pieces, this fully automatic, double carriage, all-electrically controlled machine will show amazing cost reductions. For long runs, the savings are still more substantial. A 10-year record for successful operation proves the time and cost-saving ability of the Magnamatic.

Ask our nearest representatives for complete information and suggestions on how you can utilize the Magnamatic to cut costs on turning, boring or facing work.

THE MONARCH MACHINE TOOL CO. · SIDNEY, OHIO

DIRECT FACTORY BRANCHES

CHICAGO 6, ILLINOIS
622 W. Washington Blvd.
Phone: Randolph 4295

CLEVELAND 6, OHIO
Room 209 Upper Carnegie Bldg.
10465 Carnegie Avenue
Phone: Garfield 2590

DETROIT 2, MICHIGAN
801 Fisher Building
Phone: Trinity 1-0426

INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

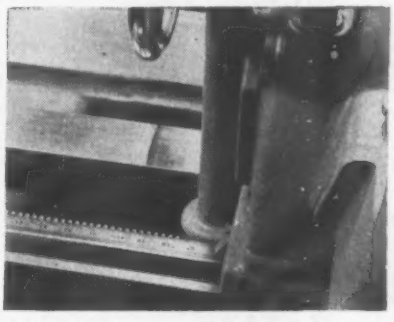
PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

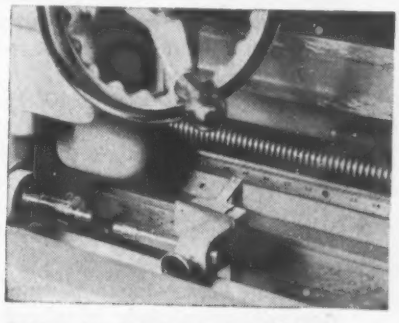
Monarch Saves Time

REMARKABLY QUICK SETUP MAKES SHORT RUNS PROFITABLE

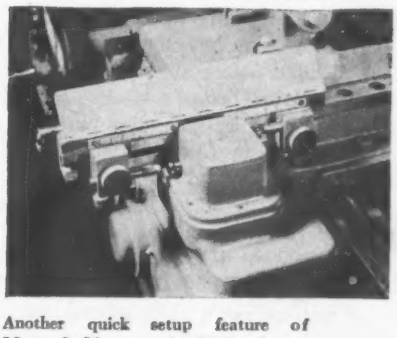
With setup time as low as five minutes in many cases, the Monarch Magnamatic is especially valuable for short runs—profitable even down to 25 pieces. Convenient handwheels and micrometer adjustments provide quick and accurate setup facilities.



Scale and pointer on tailstock for ready positioning of tailstock for various lengths of work. This eliminates necessity of repositioning on setup.



Quick positioning of stops controlling the longitudinal travel of carriage is provided by scale pointer with micrometer finger-tip adjustment.



Another quick setup feature of Monarch Magnamatics is the finger-tip control of travel to the slides, provided by this easy-reading and accurate micrometer adjustment.

BEHIND THE SCENES

Inspiration

■ More nice people seem to be saying more nice things about STEEL these days. Of course, the special Machine Tool Report brought in so many complimentary letters from government officials, associations and executives of metalworking plants that we're getting almost spoiled.

But beyond special occasions like that, the regular mails consistently have some of the best bouquets—best because they are completely voluntary and unexpected. Both advertisers and readers seem to be going out of their way "to take this opportunity to congratulate . . . etc.", all of which makes us feel very fine indeed, almost but not quite fine enough to want to stick right here at the desk and not even think about plugging for bass up north in just about two more weeks.

Good Advice

■ Naturally everything that comes in isn't a lovely little orchid. Along with everyone else these days we have our troubles too, but it's surprising how the advice of Courtney Campbell, executive head of the big Food Machinery Co., works. He says that he learned long ago to handle what's bad fast.

He tells of a time when nearly every telephone call or letter was from someone with a grievance. His instinctive thought was to postpone hearing what was troubling the man at the other end of the line. But he knew nothing was to be gained by that policy. He took up the bad things as quickly as the good things and made instant decisions, thus getting them out of the way. There's no sense, to his way of thinking, in dragging corpses around.

If there's a nasty job to be done, get it done quickly. Put it where it should be, behind you and not in front of you. When you get the bad out of the way, you clear the decks for good.

PFL

■ George Pope, western manager of *The Foundry* magazine, whose privately circulated news letter, *Contact*, has built up a proverbial host of ardent readers, pulled off a contest the other day with a first and second prize that is sure-fire bait. His letter went out a week or so before the new issue of Penton's Foundry List came off the press, and the idea was for everyone to make a guess on how many foundries would be listed for the United States and Canada, with the prizes nothing less than an honest-to-God pack of cigarettes. Well, as you can imagine, the postman almost broke his back hauling in George's mail for a few days, but it's all over now and the grand prize winner is none other than F. J. Butine, Office Manager, Centrifugal Machine & Engineering Co., Kalamazoo, Mich., whose guess of 5560 was just nine shy of the actual number. R. A. Smith, Vice President, Sterling Wheelbarrow Co., Milwaukee ran a close second with 5557.

Incidentally, copies of Penton's Foundry List are now available at $50 per copy from the Book Department, Penton Building, Cleveland 13. It is a complete picture of the foundry market, with detailed data for each company on number of furnaces and capacities, types of metal cast, and operations performed.

Moisture Proof Collars

■ Many of you recall the popular series of articles which we ran back in the early thirties under the title of "Large Uses of Steel in Small Ways". We were reminded of them in reading about the fancy enameled steel collars which were in much demand back in Civil War days, as advertised in Leslie's Weekly in 1863. It was claimed they could be "instantly cleaned by a slight rub with a wet cloth", which certainly would solve the laundry problem. An ordinary steel collar in those days set you back 30 cents, but a "snow white" cost as much as a dollar, and "illusion stitched, finished and corrugated" ran $1.25. A year later patents were granted for the first steel collar "to unite two pieces of sheet metal by a rivet", which was used to "receive and retain" the necktie.

The ladies soon took to the steel collars too, with steel cuffs to match. And what copy they ran! "They have all the dressy appearance of the finest linen. They are always starched, ironed and presentable, and are bound to stand up against all the heat and dampness that can be brought against them. Perspiration rolls harmlessly off."

Yeh, right off your collar and onto your vest.

Prize Slogan

■ Purely by accident, while rolling through some miscellaneous correspondence this week, we stumbled on a company whose slogan, carefully engraved in a well-designed business letterhead, is "BEHIND THE EIGHT BALL SINCE 1880". After rereading the line a couple of times we looked at the rest of the letterhead to find out what means the gag. Come to find out, it's no gag, because the National Billiard Mfg. Co. of Cincinnati has actually been behind the 8-ball all that time, and pushing it, too, along with the other 14 balls and the cue ball. Our vote for the most appropriate slogan to date is hereby cast.

Par 26

■ Most of the golfers who played that mathematical course outlined here a couple of weeks ago missed par by several strokes, but Jack M. Noy of Langeloth, Pa. and King D. Shwayder of Shwayder Bros., Detroit breezed around in a perfect score of 26, which can only be done by using a combination of 100 and 125 yards. A combination of 125 and 75 will put you two over par with a 28.

Revenge In Sight

■ Speaking of golf for the last time, an old friend of ours who for several years used to take our money away regularly, just airmailed that he is moving back to Cleveland and if we can find him a nice four-bedroom house out in our suburban village, he'll give us two strokes a nine for the rest of our life. The little woman can't see it, but we have it figured out it would pay us to give him our joint and make our profit at two bits a hole.

SHRDLU

Vol. 117, No. 5, July 30, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

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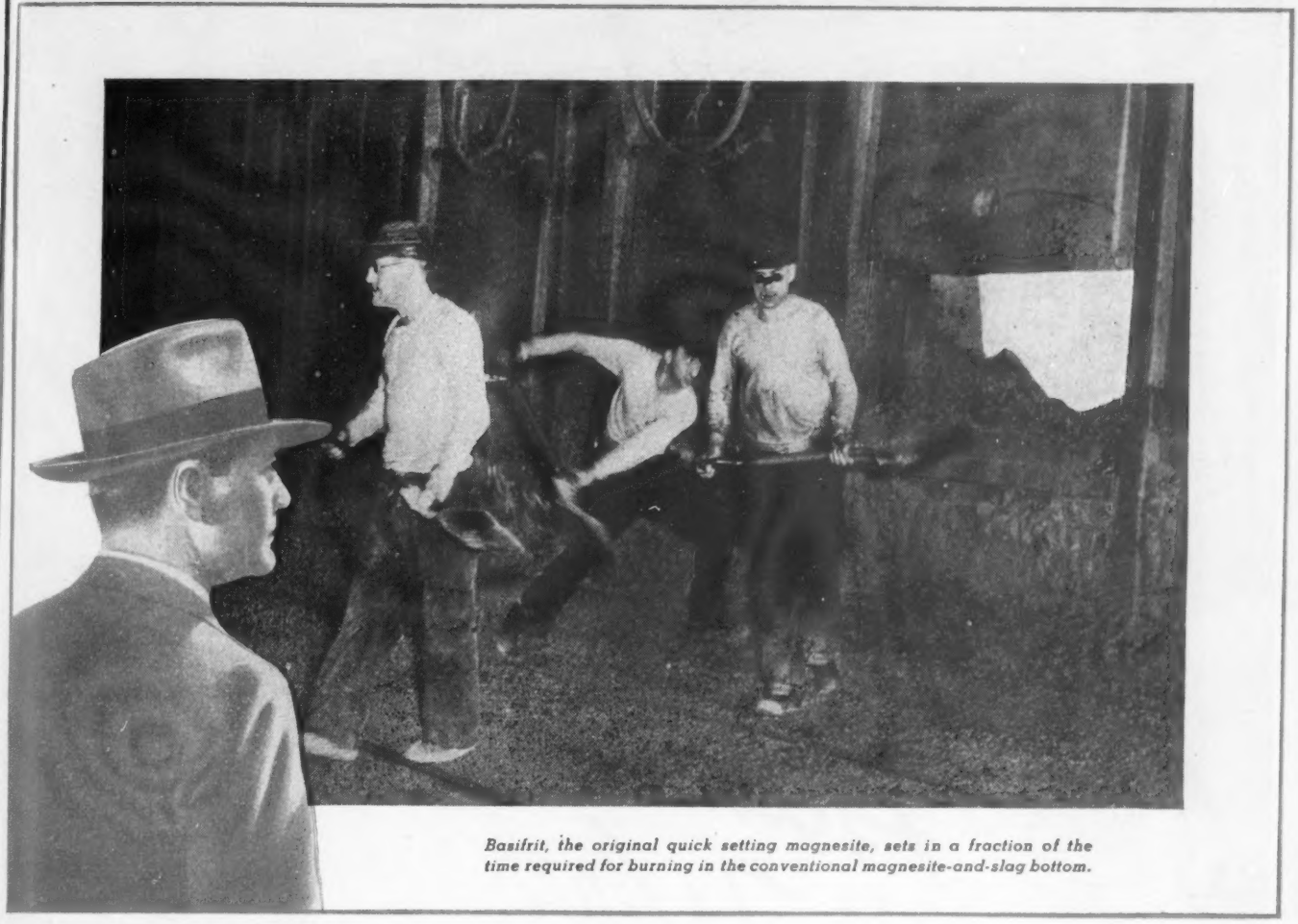


Basifrit, the original quick setting magnesite, sets in a fraction of the time required for burning in the conventional magnesite-and-slag bottom.

DON'T WAIT FOR HEARTH FAILURE TO CALL THE DOCTOR

LIKE the heart of a man under continued heavy strain, the hearth of a hard driven furnace needs watching and wise care.

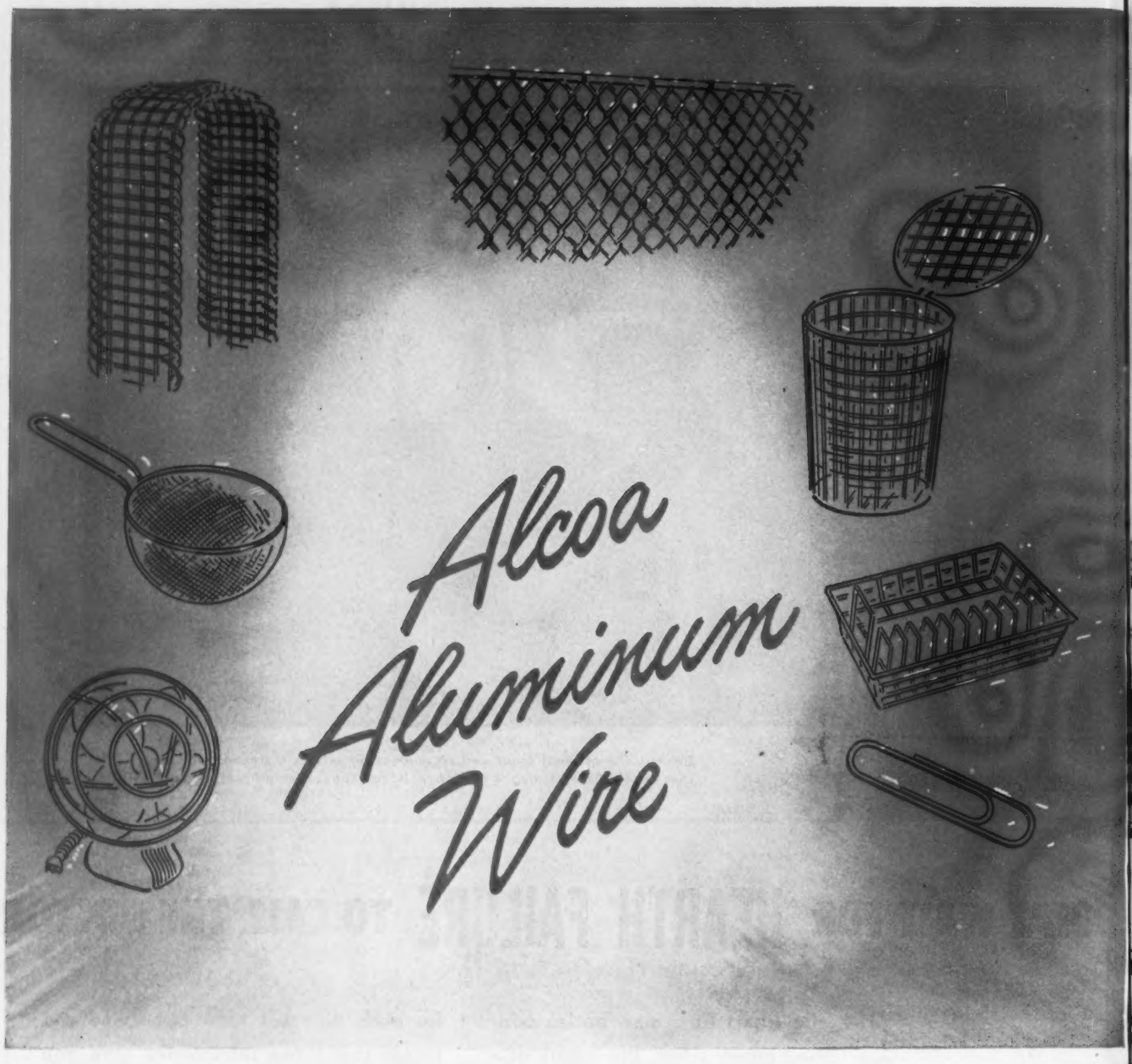
So as campaign follows campaign in the great effort to produce all the steel that America must have to win the war, it is "good health insurance" to have a hearth refractories consultant at your call.

Your dependable hearth specialist is the Basic Engineer. He is available and eager to consult with you at all times —on regular maintenance problems, as well as in emergencies. It is his primary duty to help you use the right refractory for each different type of service and to see that those refractories give you maximum value in good performance.

One of the services he is prepared to assist you with, for instance, is in setting up a program of resurfacing open hearth bottoms and banks with Basifrit. He can show you evidence which clearly demonstrates that periodic resurfacing keeps a hearth clean and dependable, and in addition measurably reduces delay time required for between-heat maintenance.

Hearth failure impairs steady open hearth steel production. Don't wait for it to call in the "doctor".

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*



OFFERS YOU THESE ADVANTAGES

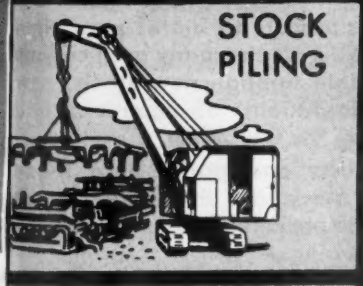
Light in weight, but strong and durable, Alcoa Aluminum wire frequently enables a manufacturer to reduce his material costs—more feet of finished product per pound. This lighter weight may also increase the use-value of his products, by making handling easier. Products made of Alcoa Aluminum wire have the added sales advantages of fine appearance and high resistance to corrosion. Aluminum puts your products in a better competitive position.

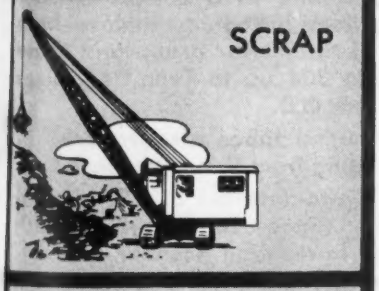
May we quote on your wire requirements? Write ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Penna.

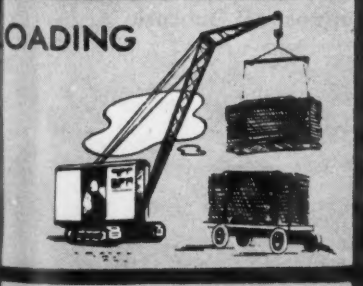
ALCOA FIRST IN **ALUMINUM**

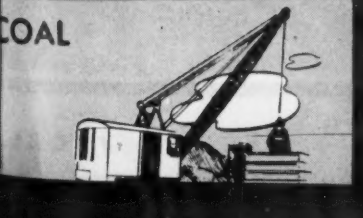
ALCOA ALUMINUM

MORE than a Single Purpose Unit!









THINK it over! What other type equipment can you buy that will do for you what a Northwest Crawler Crane can do? It is not confined to tracks but it can pull cars when required. It will go anywhere about the plant. It is not a one area machine like a locomotive crane or overhead equipment. It will operate in close quarters.

It handles any type of materials. Its work can be planned so that it can be routed from job to job. It unloads any type of conveyance. It piles high, loads to overhead decks or doors, works inside or outside and operating expenses stop when the engine stops.

Here is an ideal industrial unit that will meet all plant material handling problems. It is built in a range of sizes from 4 to 44 tons.

In planning to improve your post war efficiency, why not ask about Northwest Crawler Cranes. No obligation.

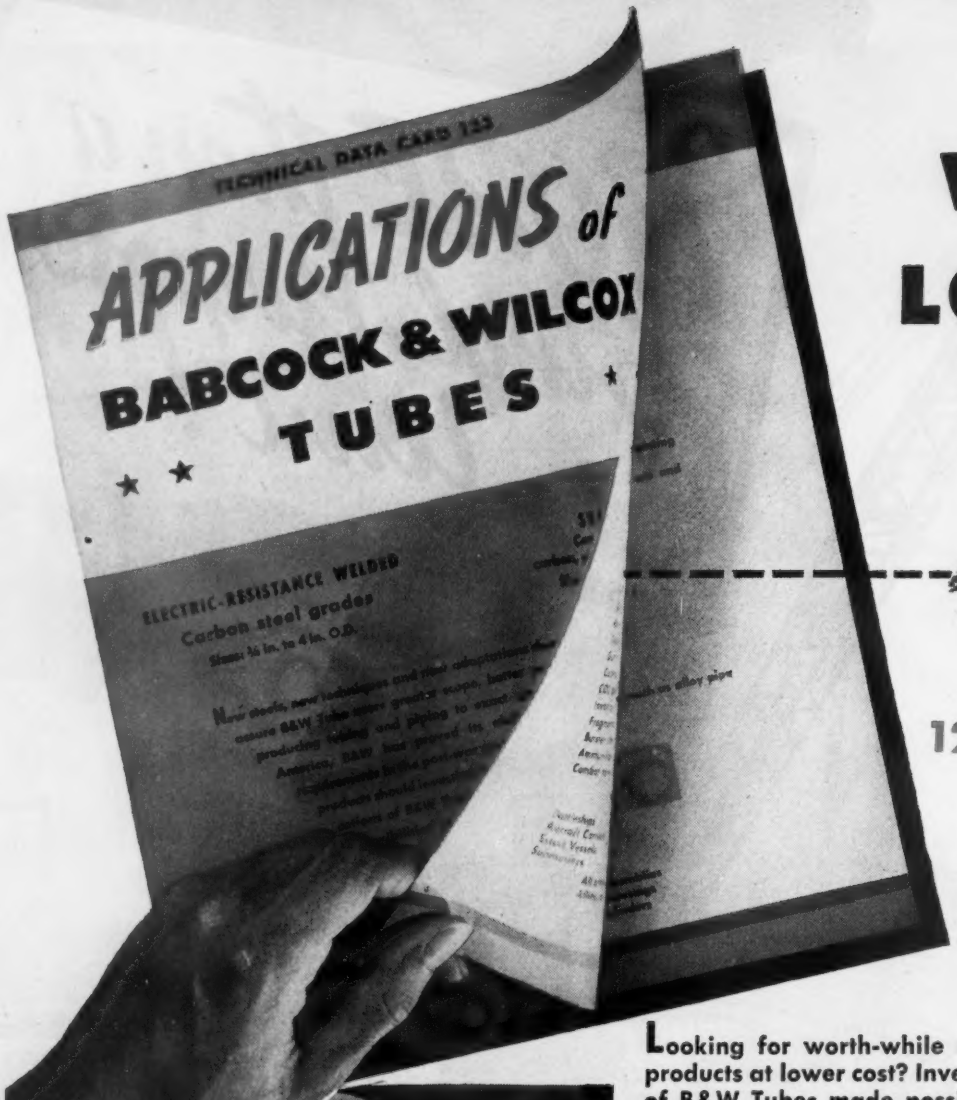
NORTHWEST ENGINEERING COMPANY

1805 Steger Bldg. • 28 E. Jackson Blvd. • Chicago 4, Ill.

FROM 4 1/2 to 44 TONS

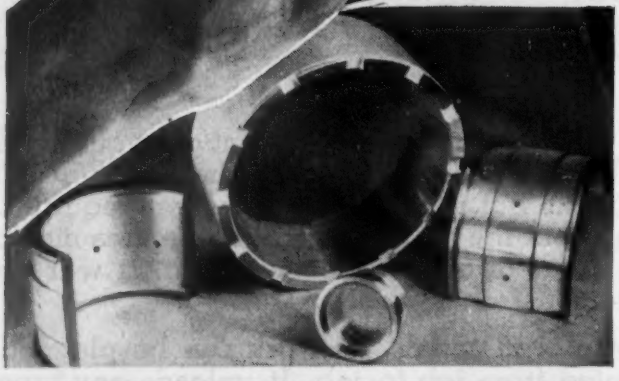
NORTHWEST

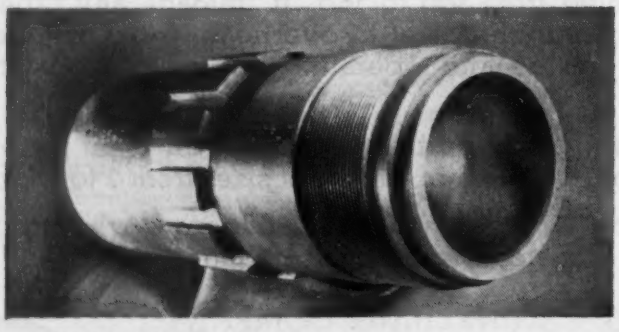
The Crane that goes Anywhere!



WORTH LOOKING INTO

120 Present Uses that suggest Future Savings





Looking for worth-while shortcuts to better peacetime products at lower cost? Investigate the many applications of B&W Tubes made possible through new steels, new techniques, and new adaptations of seamless and welded tubing demanded by the war effort.

For instance, many products and parts, once made from costly-to-handle bar stock, are now being made faster and cheaper from dimensionally accurate, easily-machined B&W seamless tubing.

B&W seamless tubes are made in a complete wide range of carbon and alloy steels including stainless—both straight chromium types of the ferritic group and those austenitic alloys from Type 304 up to Type 347. Sizes range from ½ inch to 8⅝ inch O.D.

B&W electric-resistance welded tubes are produced in carbon grades, in sizes ranging from ¾ inch to 4 inch O.D.

Just off the press is an up-to-date list of 120 proved uses of B&W Tubes. It may suggest new ways in which B&W Tubing can help you in meeting postwar competition with better products more economically produced. Write for folder "Applications of Babcock & Wilcox Tubes".

B&W TUBES

SEAMLESS. Complete range of carbon alloys and stainless steels
Sizes: ½ in. to 8⅝ in. O.D.
ELECTRIC-Resistance Welded Carbon grades
Sizes: ¾ in. to 4 in. O.D.

THE BABCOCK & WILCOX TUBE COMPANY

Seamless Tube Division
BEAVER FALLS, PA.

Welded Tube Division
ALLIANCE, OHIO

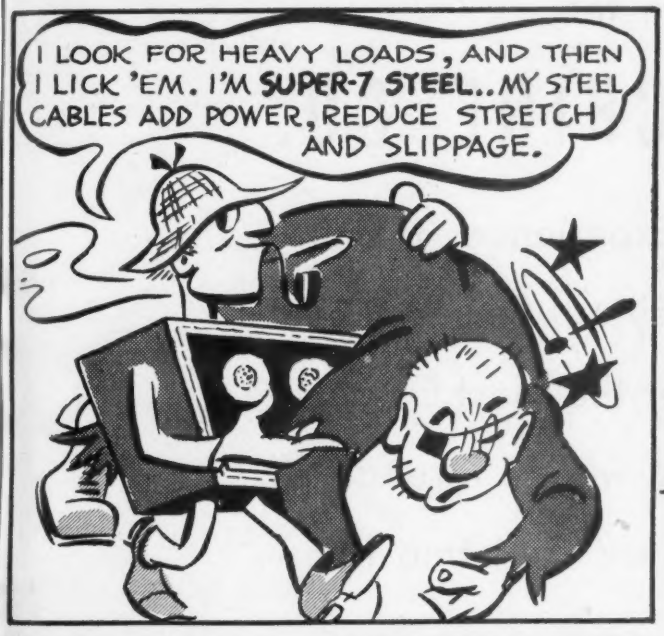
B&W MAKES BOTH

TA-1330

LOOKING for TROUBLE!

Designed to stand up in trouble spots, America's newest and widest line of V-belts — Allis-Chalmers' Texrope — solves every one of these drive problems

I FIND MY PLACE WHERE EXPLOSION IS A DANGER. I'M SUPER-7 STATIC RESISTING; MY BUILT-IN CONDUCTING ELEMENT CARRIES CHARGES TO THE MACHINE WHERE THEY'RE GROUNDED



I TAKE THE TOUGHEST OIL ASSIGNMENTS. I BATHE IN GRIMY LIQUIDS, AND DON'T MIND AT ALL. I'M SUPER-7 OIL-PROOF... SOLID NEOPRENE!
A 1862

IT PAYS TO MAKE **ALLIS-CHALMERS** YOUR

V-BELT DRIVE HEADQUARTERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.

20 Years of Grinding Threads

has given the

LANDIS MACHINE CO.

A Knowledge and Experience Gained Through Day in and Day out Performance of its Equipment, Under the Most Exacting Production Conditions, where Threads of the Finest Accuracy are of Utmost Importance.

The LANDIS LINE

THREAD CUTTING MACHINES
Landmaco Threading Machines
Bolt Factory Threaders
Automatic Forming and Threading Machines
4 Spindle Semi-Automatic Threading Machines
Pipe and Nipple Threading Machines

THREAD CUTTING DIE HEADS
Landmatic (for Turret Lathes and Screw Machines)
Landex (for Automatic Screw Machines)
Lanco (for Automatic, Semi-Automatic and Hand-Operated Threading Machines)
Lanco Pipe and Nipple Threading Heads
Stationary Pipe Die Heads
Reverse Taper Die Heads
~~Standard Rotary Die Heads~~

PRECISION THREAD GRINDERS
PIPE THREADING AND CUTTING MACHINES
ROLLER PIPE CUTTERS
CHASER GRINDERS
COLLAPSIBLE AND ADJUSTABLE TAPS

Landis Engineers, because of their long experience in both Thread Cutting and Thread Grinding, offer you an over-all expert knowledge of Grinding Practice as applied to the generation of screw threads.

Write for the Booklet
"BE THREADWISE"

Landis No. 6 Precision Thread Grinder, grinding valve stems in the plant of a leading aircraft engine manufacturer.

LANDIS
REG. U.S. TRADE—MARK PAT. OFF.

LANDIS MACHINE COMPANY

WAYNESBORO · PENNA · U·S·A·

Straightening Machines

at

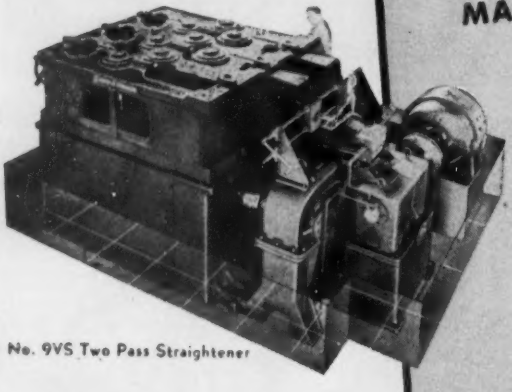
KAISER Co., Inc. and other plants throughout the U.S.A.

No. 2B 24-Roll Combination Horizontal & Vertical Straightener

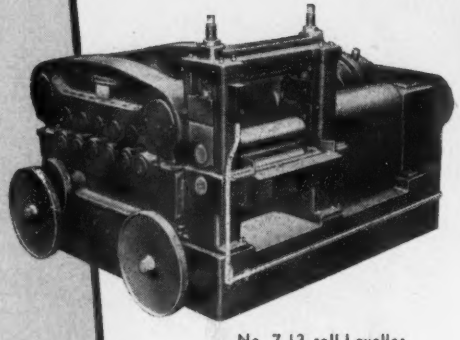
No. 3AH 9-roll Horizontal Straightener

MANUFACTURERS OF:

Straightening Rolls - Bending Rolls - Cold Roll Forming Machines - Gang Slitters - Edging Machines - Special Metal Working Equipment

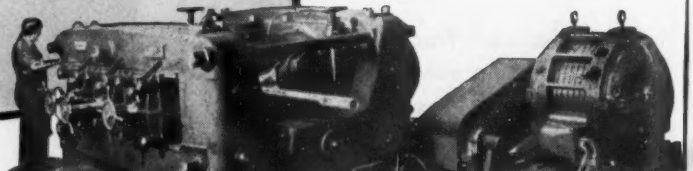


No. 9VS Two Pass Straightener



No. 7 13-roll Leveller

No. 2350-B Two Roll Rotary Straightener



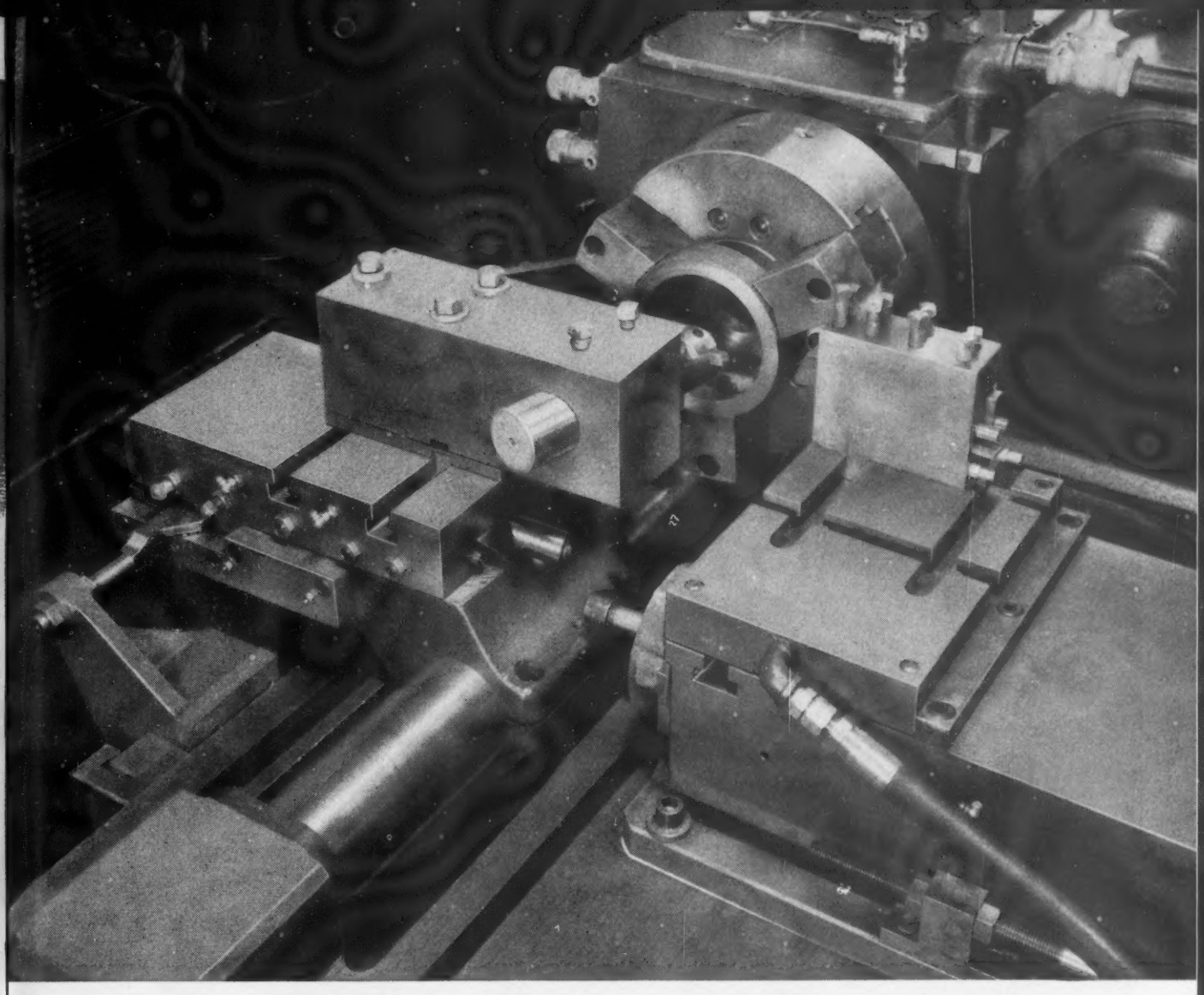
No. 5400-B Five Roll Rotary Straightener

KANE & ROACH

INCORPORATED

Syracuse, New York

Established 1887



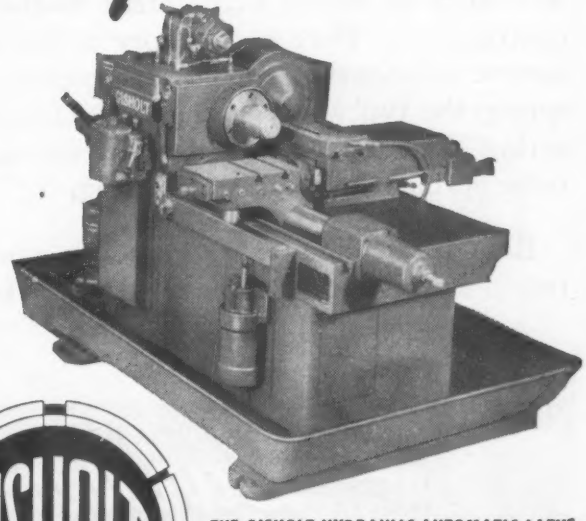
Why this AUTOMATIC LATHE maintains *Greater Accuracy*

In the **GISHOLT HYDRAULIC AUTOMATIC LATHE**, feed pressures are applied directly to tools without intermediate cams, arms or other linkage. Accuracy is further insured by feeding against dead stops. In all cuts there is a moment of dwell during which cuts are cleaned up.

Front carriage is mounted on and driven by the massive bar to which it is clamped. Wide lateral support of carriage assures rigid alignment without tremble or tremor.

Movement of the massive rear slide is by hydraulic piston in the base of the slide itself.

Both carriages are directly supported by the massive integrally cast cabinet type bed and all bearing surfaces, ways and gibs are hardened and ground to assure permanent accuracy.



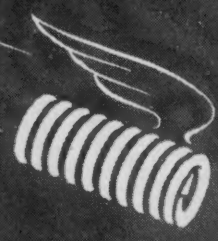
THE GISHOLT HYDRAULIC AUTOMATIC LATHE—*a genuinely rugged 12-inch lathe, also suited for light, fast jobs. Handles chucking between centers or fixture-held work.*

GISHOLT MACHINE COMPANY
217 East Washington Avenue • Madison 3, Wisconsin

Look Ahead... Keep Ahead... With Gisholt Improvements in Metal Turning

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

MECHANICAL Progress

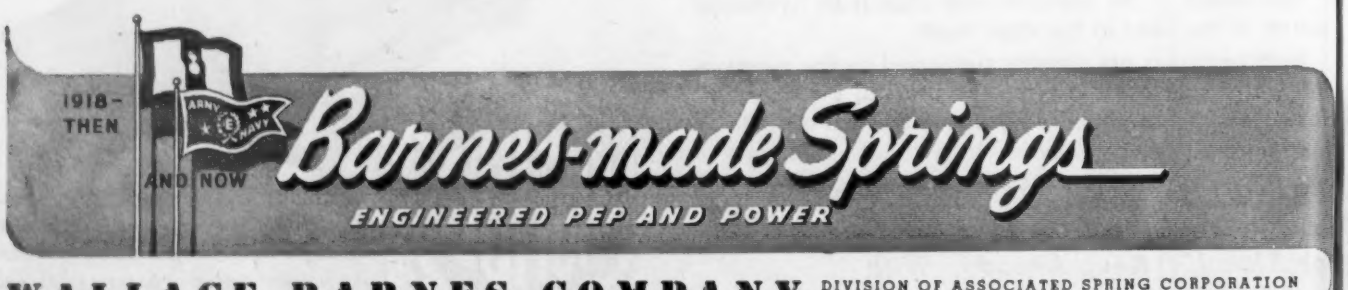


POWERED BY SPRINGS

IN the files at the Barnes plant is the spring history of almost every great mechanical contribution. Here is the story of the automotive valve spring, the aircraft engine valve spring, the typewriter spring, the refrigerator spring—and today, the helicopter spring, the radar spring, the bomb-sight spring.

Blue prints and "specs" are the tangible record of these developments—but only in the memories of Barnes craftsmen and engineers are the hours of experiment and research from which grew the final, smoothly functioning springs.

Responsibility that comes with long and close associations imposes an obligation to explore and develop the scope of spring performance—not only for present purposes—but for new milestones in mechanical progress—whatever they may be.

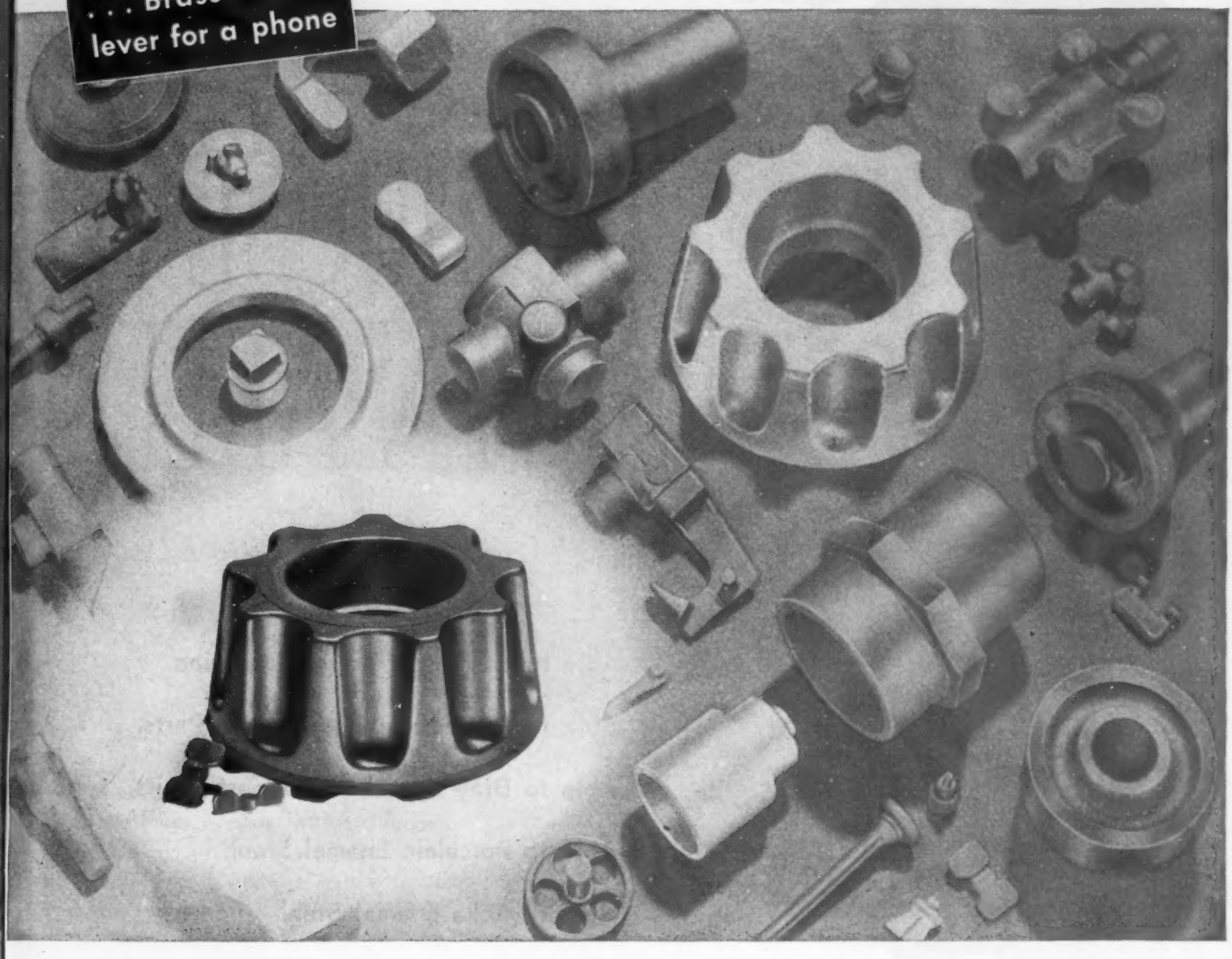


WALLACE BARNES COMPANY DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL, CONNECTICUT, U. S. A.

SCOVILL FORGINGS

for dependability
under difficult operating conditions

Aluminum (censored) for a plane . . . Brass switch lever for a phone



Censorship forbids telling you any more about the end use of the aluminum forging spotlighted above than that it's for a secret device on big bombers. We can say, though, that Scovill engineers, working backwards from the finished piece, designed and produced a forging that saved material and machining costs and helped retain in the finished piece the great strength required for its particular function.

Also under Government secrecy orders is the tiny, brass thumb switch lever for a hush-hush telephone. Scovill forges two levers in one piece and saws them apart to keep strength high and costs low.

Those and the other illustrated examples of Scovill's ingenious forging ability suggest that you, like more than 3,000 satisfied Scovill customers, can save time, trouble and money by letting Scovill do your designing, die-making and forging.

For further proof of Scovill's ability to design the *right* forging for you and produce it from the *right* metal, fill in the coupon below and get the free booklet "Masters of Metal".

Scovill
MANUFACTURING COMPANY
WATERBURY 91, CONN.

Please send me a free copy of *"Masters of Metal"* booklet describing your facilities. I am interested in the metal forgings applications checked.

☐ Valves, Torch Heads, Regulators, for compressed gas cylinders, Welding and Blow Torches, etc. ☐ Household Appliance Parts ☐ Plumbing Goods (valves, etc.) ☐ Industrial Instrument Parts ☐ Aircraft Parts ☐ Communications Equipment Parts ☐ General Electrical Product Parts ☐ Fire Extinguishers ☐ Cameras ☐ Oil Burners ☐ Band Instruments

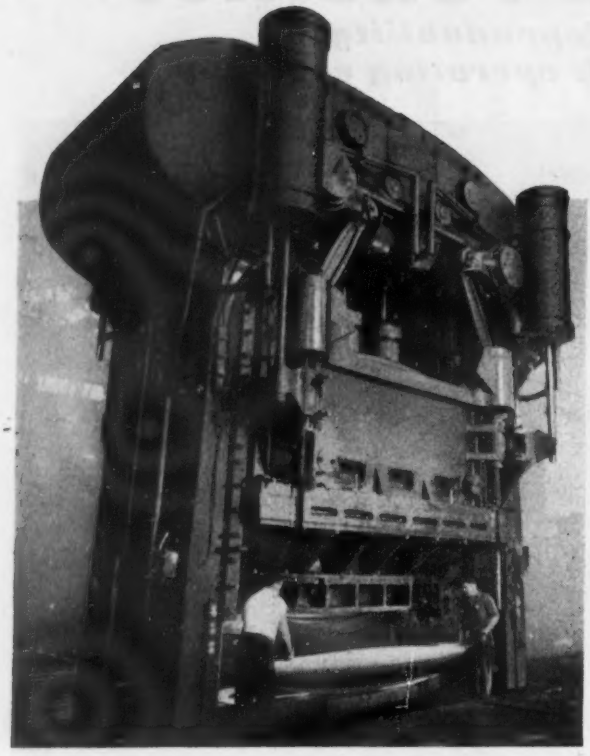
Other applications.....

SCOVILL MANUFACTURING COMPANY
Forgings Division
20 Mill Street, Waterbury 91, Connecticut

Name .....

Company .....

Address .....



The HOUSE of SEVEN ABLES

Until the last shot is fired — buy bonds — give blood — salvage fats and paper — work for Victory. Then do your part to ...

The FREE American Way

1. Able to design for Press Production.
2. Able to Press the Largest Metal Parts.
3. Able to Draw Metal to Deepest Limits.
4. Able to Porcelain Enamel Steel.
5. Able to Bake Enamel Steel.
6. Able to Spot, Seam, or Acetylene Weld.
7. Able to Machine and Finish.

Mullins, "The House of Seven Ables", invites you to take advantage of Mullins design engineering and metal pressing experience. Call for a Mullins Press Engineer.

Manufacturers of
Youngstown Kitchens by Mullins

DESIGN ENGINEERING SERVICE
LARGE PRESSED METAL PARTS
PORCELAIN ENAMEL PRODUCTS

Mullins
MANUFACTURING CORPORATION
SALEM and WARREN, OHIO

Mullins can PRESS it from METAL instead.

Strip act that keeps 'em cool!

IN a ship's boiler tubes, scale or sediment is constantly forming—preventing proper transfer of heat by acting as insulation between the water and the metal. Result—excessive heat builds up in walls of the tubes, and costly burnouts may occur.

To keep marine boiler tubes from becoming overheated, deposits must be regularly stripped from the tube walls. Long-handled flexible tools equipped with wire brushes are used to remove this sediment before it accumulates sufficiently to cause damage.

Wire for these brushes must meet unusually rigid specifications: If wire is too *soft,* it may fail to remove the deposits and will wear out too quickly. If it is too *hard* it may severely score the tube walls. It must be precision tempered to *exactly* the *right* hardness.

Small wonder that manufacturers of tube cleaning equipment—like scores of other industries—turn to Worcester Wire Works for the *precisely correct wire for the job.* For more than thirty years, all the skill and facilities of Worcester Wire Works have been devoted to the development of new wire for new purposes—and the drawing of wire to meet virtually every kind of specification.

NS
WORCESTER
WIRE WORKS
•
MEMBER OF NATIONAL-STANDARD

BUY AND KEEP WAR BONDS AND STAMPS

Divisions of National-Standard Company

WORCESTER WIRE WORKS
Worcester, Mass.
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ROUND STEEL WIRE, SMALL SIZES

NATIONAL-STANDARD CO.
Niles, Mich.
TIRE WIRE, FABRICATED BRAIDS AND TAPE

THE ATHENIA STEEL CO.
Clifton, N. J.
COLD ROLLED, HIGH CARBON SPRING STEEL

WAGNER LITHO MACHINERY CO.
Hoboken, N. J.
LITHOGRAPHING AND SPECIAL MACHINERY

TYPE W-56

Copyright 1943
General Electric Company

Only **TYPE W-56** *offers ALL these features*

Welds have excellent surface and profile appearance

●

Deep-penetrating, spray-type arc

●

Welds in all positions

●

A-c or d-c operation

SPECIFICALLY designed for welding carbon-molybdenum steels, in all positions, this new G-E electrode can also be used successfully on other low-alloy, high-tensile materials. W-56 is the *first* electrode to meet all of the requirements of AWS Classification E7010/E7011. And it is the first to permit the use of *either* a-c or d-c for all of these applications. Even more important, the recognized advantages of the a-c welding process are now made available to industry for high quality welding of low-alloy, high-tensile steels in the vertical and overhead positions.

Type W-56 Welds Exceed Specifications

Heavily covered, Type W-56, provides a steady, spray-type, deep-penetrating arc which produces a weld of superior quality and excellent appearance. Its light, friable slag is readily removable and sets up rapidly, facilitating welding in the vertical and overhead positions.

Although Type W-56 is designed for use in all positions, its superior welding qualities are most noticeable when it is used in the vertical. The bead obtained is relatively flat, with smooth uniform ripples. X-rays of plates welded in the vertical position are exceptionally clean, and the mechanical properties of specimens are well above specification requirements.

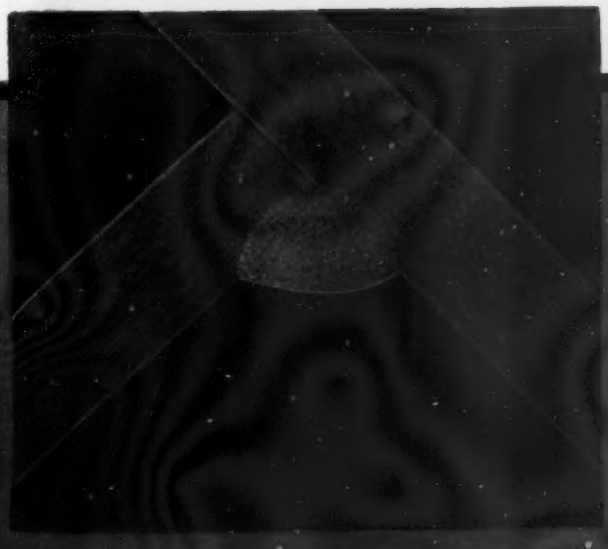
Test Type W-56 Yourself

If your welding work includes the fabrication of pressure vessels (fittings), pressure piping or other applications involving the welding of low-alloy, high-tensile steel try the new Type W-56 electrode. Ask your G-E arc welding distributor for samples and see for yourself the increased welding production and superior welds obtainable with this newly-developed rod. Your distributor can also provide you with detailed performance data. Or, write General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

673-57-8748

THE FIRST E7010/E7011 ELECTRODE FOR WELDING LOW-ALLOY, HIGH-TENSILE STEELS



This single-pass fillet, made in the vertical position, illustrates the deep penetration and excellent fusion obtained with Type W-56

Of carbon-moly steel, this transformer radiator assembly being welded in the vertical position is typical of the applications for which Type W-56 was designed. Either a-c, as in the illustration, or reverse polarity d-c can be used.

RANGE OF MECHANICAL PROPERTIES

(Stress Relieved)

	Alternating Current		D-c Reverse Polarity	
1/8-in. Diameter				
Tensile	76,000	78,000	73,000	73,000
Yield	60,000	62,000	56,000	58,000
Elong. % 2 in.	26.0	28.0	27.0	28.0
Reduction %	67.0	73.4	62.5	71.4
5/32-in. Diameter				
Tensile	70,700	72,500	73,000	71,000
Yield	54,500	57,500	59,500	57,500
Elong. % 2 in.	28.0	29.0	26.0	25.0
Reduction %	69.0	67.0	67.0	64.5
3/16-in. Diameter				
Tensile	75,500	76,500	72,000	73,500
Yield	61,200	62,500	58,000	57,000
Elong. % 2 in.	32.0	30.0	28.0	29.0
Reduction %	68.0	67.0	64.5	67.0

ARC WELDING ELECTRODES AND EQUIPMENT

Buy all the BONDS you can
—and keep all you buy

these MO-MAX high speed steels

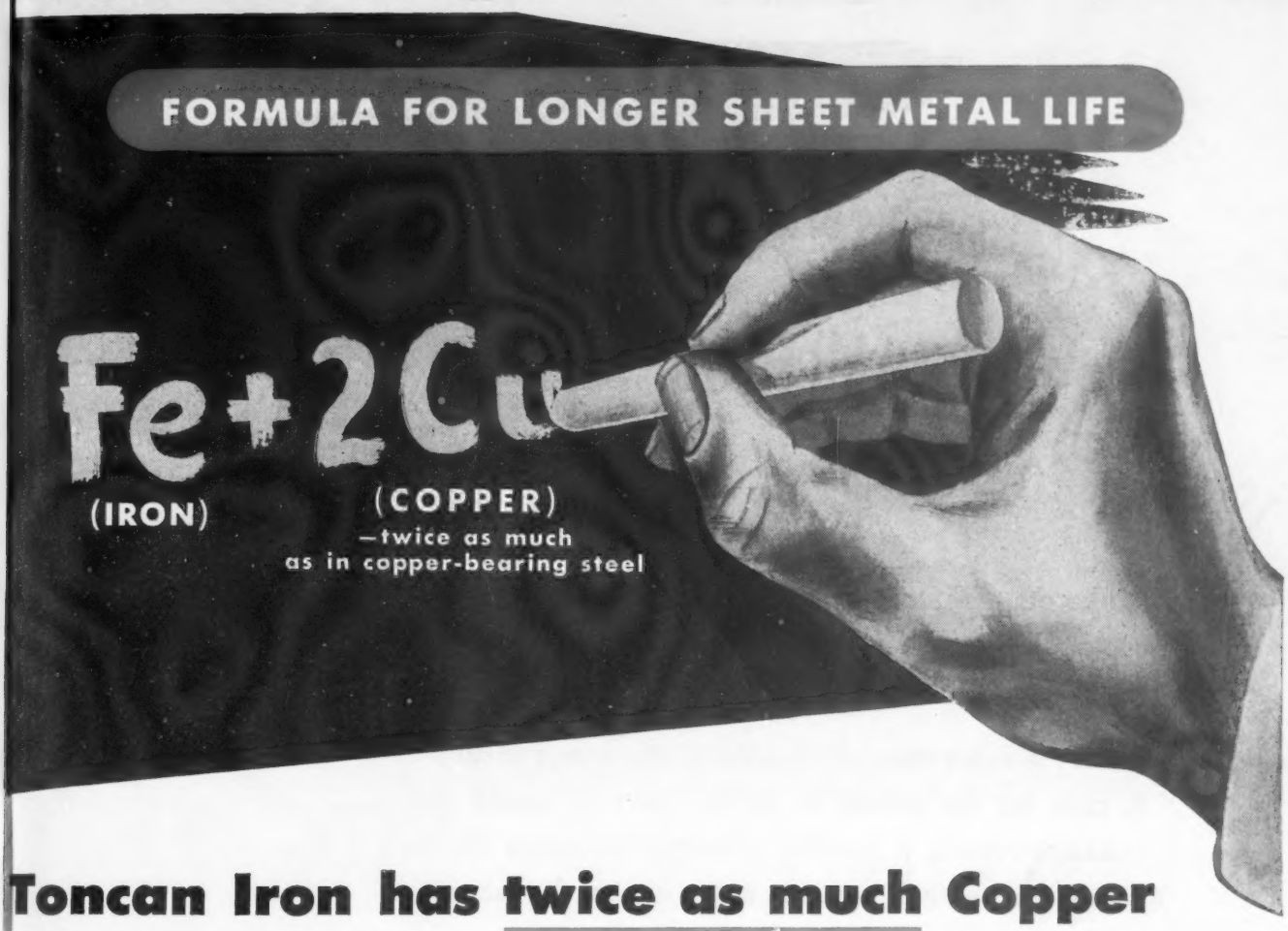
"LMW"	ALLEGHENY LUDLUM STEEL CORP.
"MOHICAN"	ATLAS STEELS, LTD.
"BETHLEHEM HM"	BETHLEHEM STEEL COMPANY
"MO-CUT"	BRAEBURN ALLOY STEEL CO.
"STAR MAX"	CARPENTER STEEL COMPANY
"MOLITE M-1"	COLUMBIA TOOL STEEL CO.
"REX T-MO"	CRUCIBLE STEEL CO. OF AMERICA
"HI-MO"	FIRTH-STERLING STEEL COMPANY
"DI-MOL"	HENRY DISSTON & SONS, INC.
"REX T-MO"	HALCOMB STEEL COMPANY
"MOGUL"	JESSOP STEEL COMPANY
"TATMO"	LATROBE ELECTRIC STEEL CO.
"S. T. M."	ST. LAWRENCE ALLOYS, INC.
"MO-TUNG"	SIMONDS SAW & STEEL CO.
"8-N-2"	UNIVERSAL-CYCLOPS STEEL CORP.
"VUL-MO"	VANADIUM-ALLOYS STEEL CO.

assure BETTER performance of

DRILLS • REAMERS • LATHE TOOLS • CUT-OFF TOOLS • TOOL BITS • MILLING CUTTERS • HOBS • CIRCULAR SAWS • THREAD ROLLING DIES • COUNTER-BORES • BROACHES • LATHE CENTERS • SPOT FACERS • CIRCULAR AND FLAT FORMING TOOLS • DIES FOR BOTH HOT AND COLD WORK • TAPS • THREAD CHASERS, ETC.

For the full story on MO-MAX high speed steels—their physical properties, their advantages, and how to heat treat them—write today to Department D for the new, revised MO-MAX Handbook.

THE CLEVELAND TWIST DRILL CO. • 1258 East 49th St. • Dept. D • Cleveland 14, Ohio



Toncan Iron has twice as much Copper

to give it the Highest Rust-Resistance of All Ferrous Materials in its Price Class

You'll immediately recognize the rust-resisting qualities of the second ingredient of Toncan Iron. It's Copper (Cu)—and there's twice as much of it in Toncan Iron as in copper-bearing steel.

That's another reason why Toncan Iron—well and favorably known for more than 35 years—has the highest rust-resistance of all ferrous materials in its price class.

Toncan Iron fights rust better, too, because it is made from highly refined open-hearth iron.

The rust-resistance of Toncan Iron is further improved by alloying *molybdenum* with the copper. This important element makes the copper more effective and helps produce in Toncan Iron a rust-resistance that is unaffected by various methods of fabricating.

From the commercially pure open-hearth iron and the special processing operations, Toncan Iron derives another outstanding quality—high ductility. This makes it one of the easiest materials to work.

If you want a better answer to your needs for a rust-resistant material, you'll find it in the formula for Toncan Iron—the formula for longer service and lower costs.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Bldg., New York 17, N.Y.

Republic

TONCAN COPPER MOLYBDENUM **IRON**

Reg. U. S. Pat. Off.

—for those parts of your product and for those sheet metal applications in your plant where low-cost resistance to rust is needed.

IS IT LATER THAN YOU THINK?

Oiljak, like other American manufacturers, continues to devote all its facilities to the production of war material, to speed the approaching day of victory.

Yet, at the same time, we consider it no less our duty to plan for the future, to do our part in easing the change-over to a healthy industrial economy during the competitive peacetime years that lie ahead of American industry.

Oiljak offers you complete manufacturing facilities with up-to-date machines operated by men whose production record on war contracts compares favorably with normal peacetime costs; a record achieved by a minimum of rejections, a steady streamlined flow of work and materials through the plant, and a special assembly-line technique for which Oiljak is famous.

So before you set up the manufacturing procedure for *your* peacetime products, it may well be worth your while to get acquainted with all the facilities which Oiljak can offer you.

MACHINING · STAMPING · WELDING · PLATING · FINISHING · ASSEMBLING

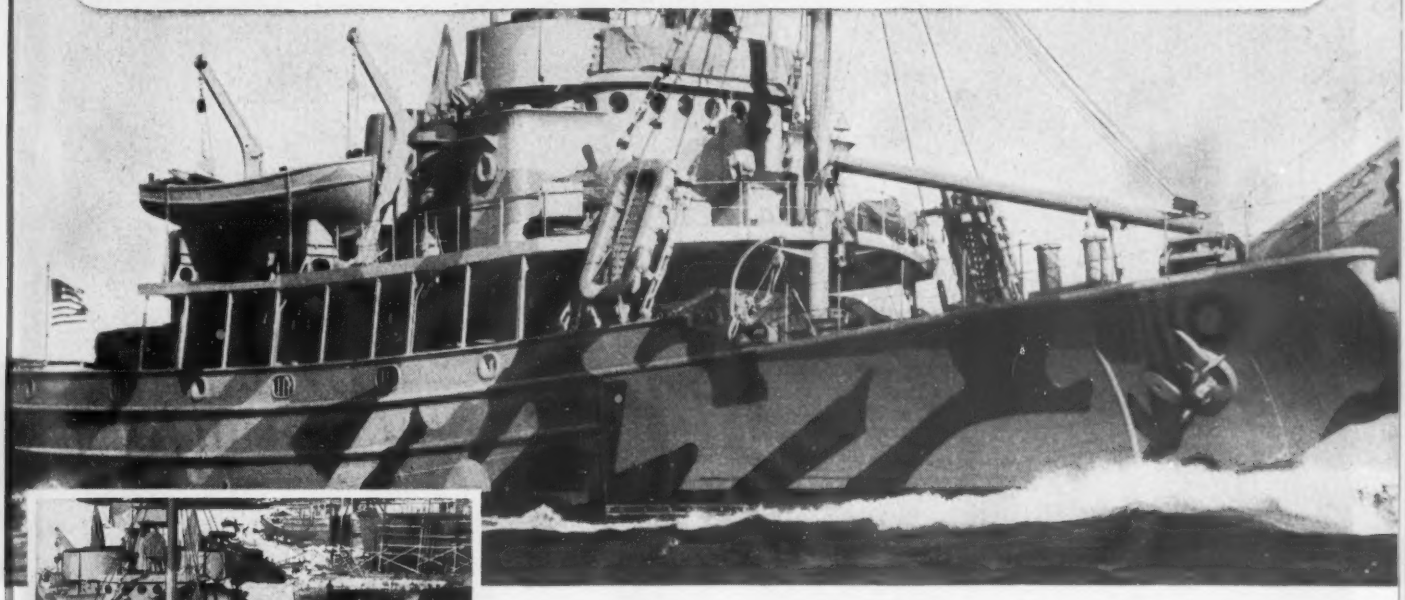
METAL MANUFACTURERS

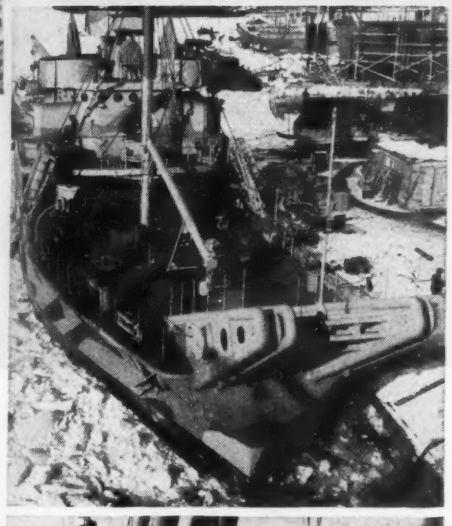
THE OILJAK MANUFACTURING Co., INC.

MONTCLAIR, NEW JERSEY

THE JOB COMPLETE FROM BLUEPRINT TO FINISHED PRODUCT

"WAREHOUSE STEEL" built this Net Tender!





Practically every pound of STEEL for this ship was supplied from our Warehouse Stocks.

A SHIPYARD in Sturgeon Bay, Wisconsin, called us in and showed us a list of steel that was needed in a hurry to build the Navy net tender shown above. We checked the inventories of all our warehouses and found that we could supply almost the entire order *from our warehouse stocks* . . . dramatic evidence of the wide variety of steel available in our warehouses for quick shipment. The hundreds of steel items needed for this job were all delivered on time, enabling the shipbuilder to maintain his production schedule.

When you need steel—whether a pound or a carload—get in touch with our nearest warehouse. Our stocks include all standard grades and sizes of U·S·S Stainless Steel and a complete line of Carbon Steel Products. Our service may help you solve a production problem —avoid serious delay on important war work. Your orders and inquiries will receive courteous attention and quick action.

UNITED STATES STEEL SUPPLY COMPANY

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NEWARK (1), N. J.	Foot of Bessemer St., P. O. Box 479	Bigelow 3-5920
		REctor 2-6560 · BErgen 3-1614
PITTSBURGH (12),	1281 Reedsdale St., N. S.	CEdar 7780
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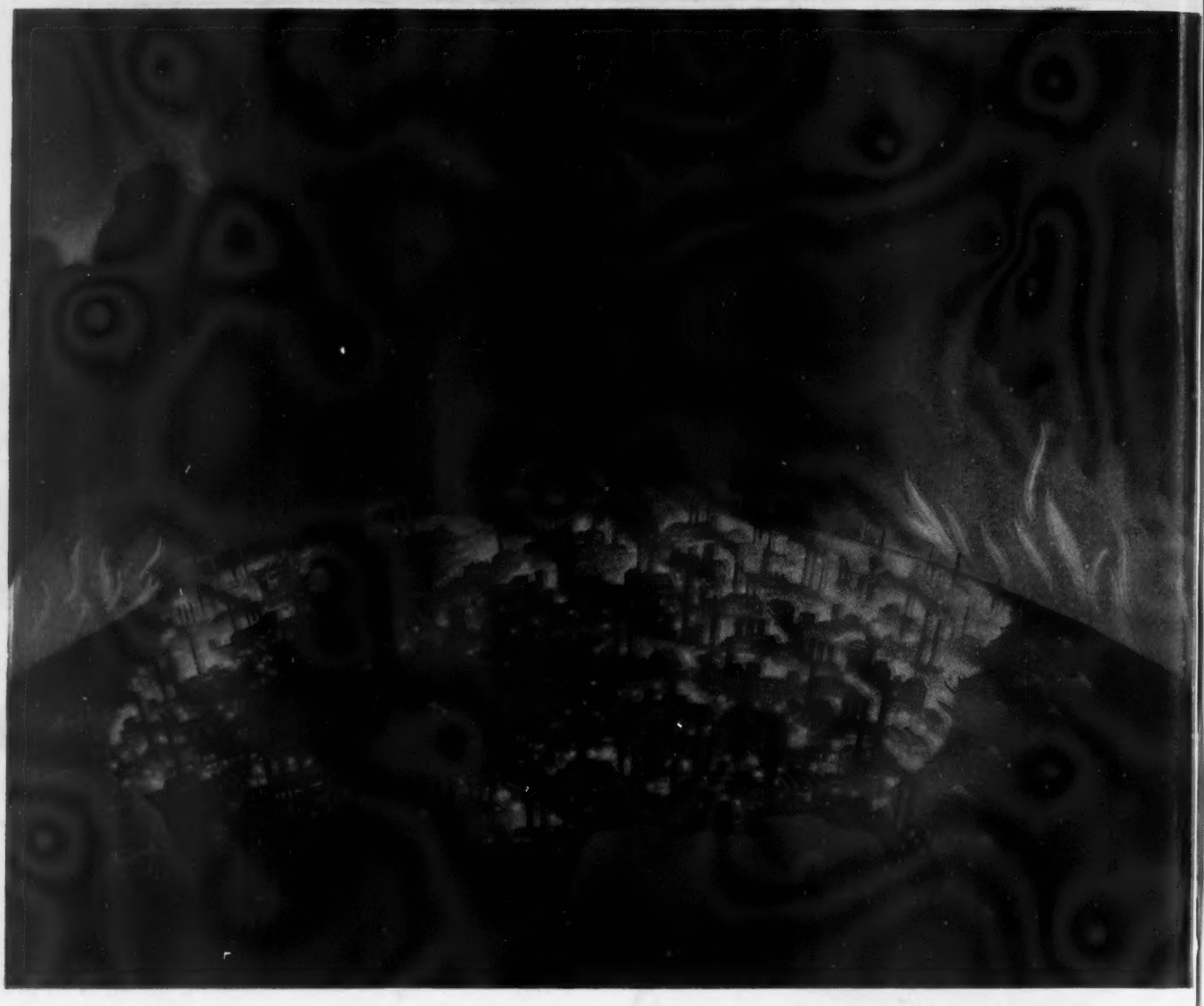
UNITED STATES STEEL SUPPLY COMPANY · USS · STEELS · SERVICE

UNITED STATES STEEL



WHEN THE FLAMES DIE DOWN OVER THERE—
what happens over here?

MERITS OF ALLEGHENY METAL

- ★ Great strength, retained at extremes of heat and cold.
- ★ Tough and impact-resistant.
- ★ Favorable strength-weight ratio.
- ★ Highly corrosion-resistant.
- ★ Inherent, lasting beauty.
- ★ Easy to form and weld.

ON one thing we're all agreed—the lights of industry in this country must die down as little and as briefly as possible, in the turn-back to peace. Getting tools and dies ready—knowing how you'll start, what products you'll make, what materials you'll need—those are patriotic as well as economic necessities *now,* without taking away at all from the first importance of the war.

In working your problems of redesign and new design, when you come to the matter of materials, that's where we can be of help. Remember that the function of Allegheny Metal, pioneer stainless steel in America, is always to *improve:* strength, service life, cleanliness, appearance—whatever means most to you.

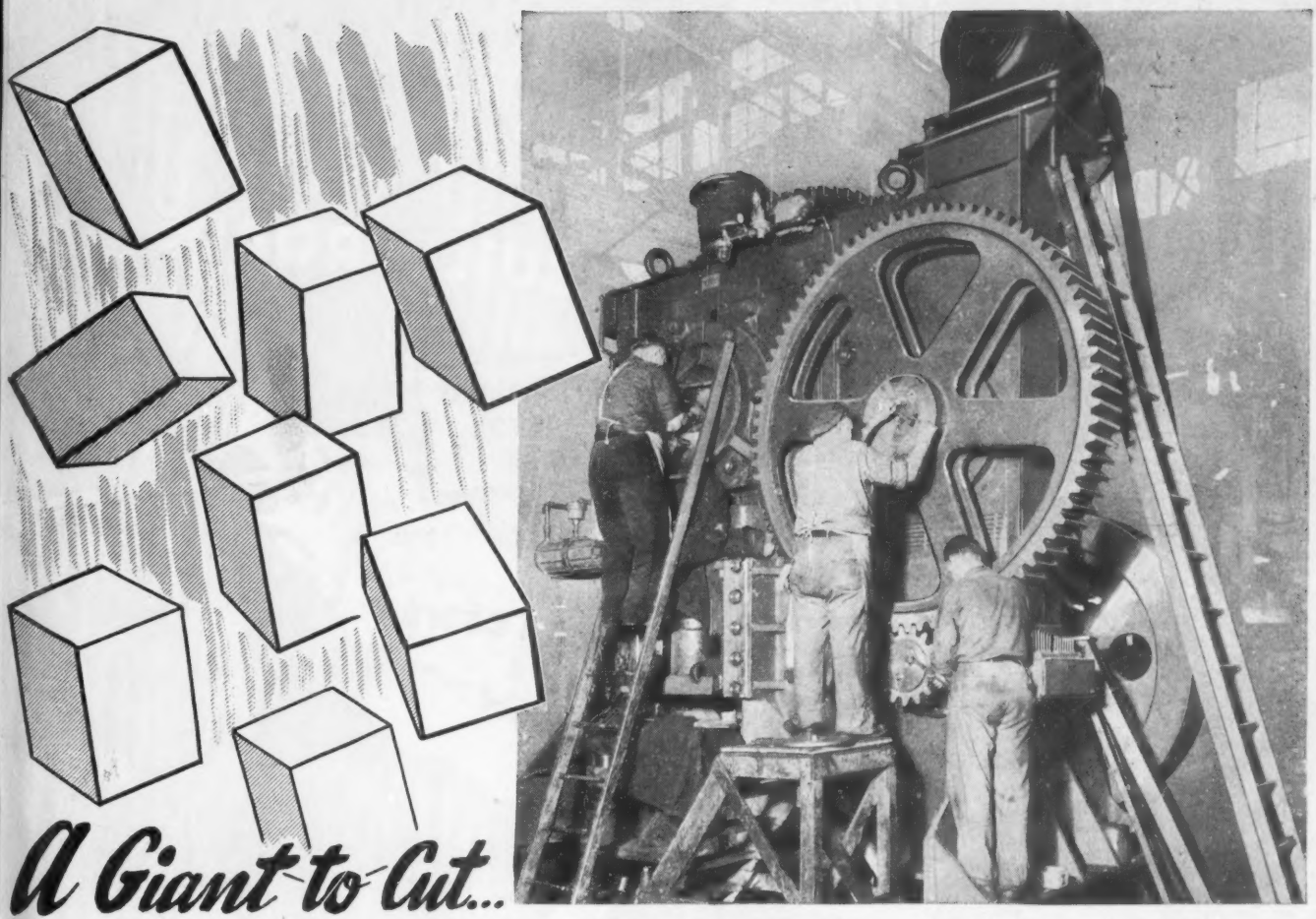
Call on us for any assistance you need—either in the use of Allegheny Metal or any of our other special alloy steel families: tool and die, electrical, valve or nitriding steels.

Allegheny Ludlum Steel Corporation
Brackenridge, Pennsylvania

ALLEGHENY METAL
The Time-Tested Stainless Steel

W&D 9495 D

ALSO HANDLED AND STOCKED BY ALL JOSEPH T. RYERSON & SON, INC. WAREHOUSES



A Giant to Cut...

Buffalo No. 16 Billet Shear now being constructed for a large manufacturer of forgings.

8 HUSKY CHUNKS OF ALLOY STEEL BILLET *A MINUTE*

...THIS "Buffalo" BILLET SHEAR

—*tremendous* in both size and bite, will cut eight chunks of forging stock a minute from tough alloy steel billets. "Buffalo" Billet Shears are easy to control, positive and accurate. They're doing a mighty job in starting shells and other Victory "tools" on their way . . . and are ready to step right into full peacetime output with all the economy of operation and TOUGH, 24-hour-a-day dependability they've already *proven* in wartime production! Full engineering data on the eleven standard sizes, in Bulletin 3295, yours on request.

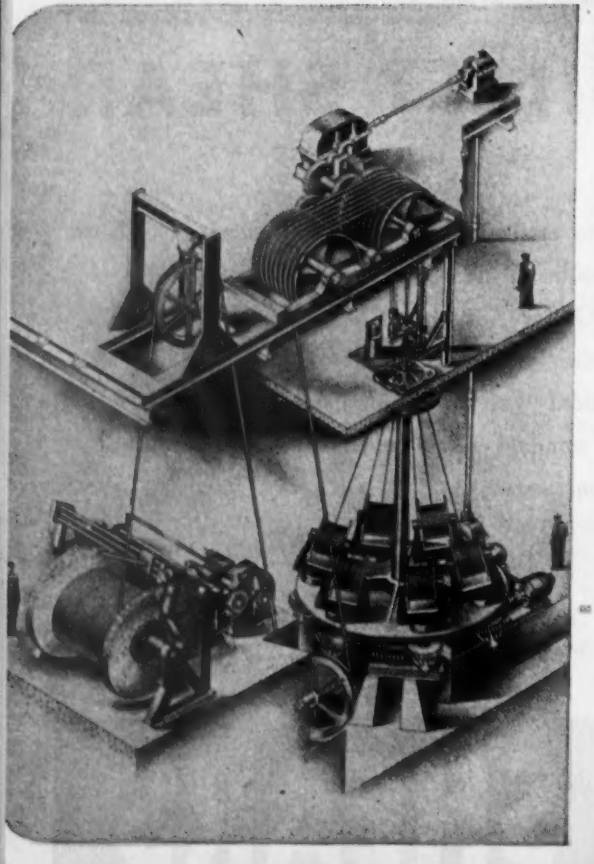
BUFFALO FORGE COMPANY
158 Mortimer Street — Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" BILLET SHEARS

WHICH WILL BUILD ROADS . . .

NO PROVISIONS MADE FOR FUNDS
NO PLANS OR PROGRAM
UNITED STATES OF COMPLACENCY
HEADING FOR FEDERAL PREEMPTION INSTEAD OF FEDERAL COOPERATION



New War-Borne Techniques Will Make America's Competitive System of Private Enterprise More Efficient Than Ever Before!

Although geared largely to war production, the Union Wire Rope organization is prepared to shift overnight to fill home-front requirements in wartime tempo. For instance, at the left is shown a giant wire rope closing machine developed by Union Wire Rope engineers in the war emergency. It is three stories high, has a range of ¾ inch to 4 inch wire rope and a maximum capacity of 27 tons of wire rope in one continuous length. Union engineers have devised many other new facilities and techniques with which to serve private enterprise more efficiently than ever before. Our war work has been such that our craftsmen will not have to relearn their skills.

union *Wire Rope*

UNION WIRE ROPE CORPORATION

2160 Manchester Avenue Kansas City 3, Missouri

Tulsa 3 Houston 11 Chicago 6 Salt Lake City 13 New Orleans 16
Monahans, Tex. Portland 10, Ore. Ashland, Ky. Atlanta 1

. . . STREETS • AIRPORTS • FLOOD CONTROL
. . . keys to new frontiers?
PLANS AND PROGRAM COMPLETE
FUNDS PROVIDED FOR
UNITED STATES OF ALERTNESS!
READY TO LET COMPETITIVE CONTRACTS TO PRIVATE ENTERPRISERS

Let's pull together

FOR THIS KIND OF AN AMERICA

Americans have called upon their national leaders for a far-reaching highway system, a network of airports, and a long-studied program of flood control and land conservation. Why? Because they are the keys that will open new frontiers and because they are among the few proper and fertile fields for the investment of public funds.

Our leaders in Congress have responded by approving our largest highway and flood control programs and doubtless will respond with an airport program.

But, the approved programs are not being pushed to final*ization* in many states. The National Highway Program, for example, is based upon state responsibility for plans by State Highway officials and funds by State Legislatures. No citizen can afford to let this sound program go by default. If there is a lag in your theatre of operations, make it your concern. Send the coupon for "The Road Ahead", published by the American Road Builders' Association, and "Put Your Town on the Air Map", published by the Personal Aircraft Council of the Aeronautical Chamber of Commerce of America.

UNION WIRE ROPE CORPORATION, 2160 Manchester Ave., Kansas City 3, Mo.

☐ Send a Free copy of book entitled "The Road Ahead"
☐ Send a Free copy of book entitled "Put Your Town on the Air Map"

*Name*_____

Firm _____

*Address*_____ *City*_____ *Zone*___ *State*_____

D-45

Dipped in Molten Zinc

FOR THE UTMOST IN RUST PREVENTION

"I predict that the most certain major changes in greenhouse construction will be the universal use of Hot-Dip Galvanizing to prevent the need of maintenance."

T. E. KING, *Vice President*
LORD & BURNHAM COMPANY

Two examples of steel constructed greenhouses by Lord & Burnham Co., Designers and Builders of Greenhouses since 1856 . . . Hot-Dipped Galvanized throughout for protection from weather and condensation.

Day after day more new users are anticipating longer life and greater uninterrupted service for their products and installations by specifying Hot-Dip Galvanizing.

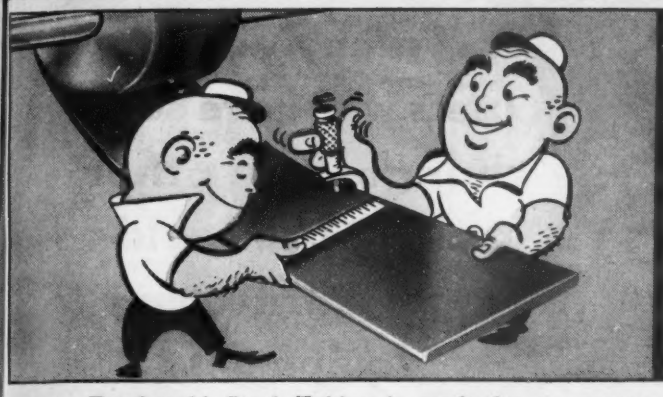
Thousands of installations mutely testify that the definite fusion of molten zinc with the base metal —through the Hot-Dip Galvanizing Method, increases the life of iron and steel products and installations—years and years beyond their normal expectancy. This process has saved users millions of dollars in expensive maintenance and replacement costs.

If the life of your products is menaced by corrosion—here is the solution to your problem. Conclusive tests have proved that Hot-Dip Galvanizing provides *the utmost in rust prevention.*

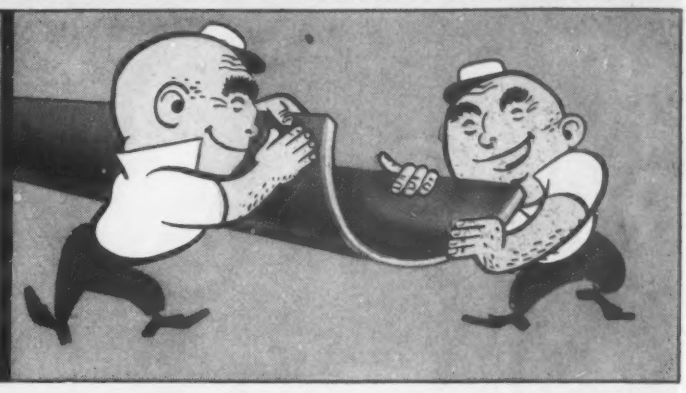
There is a member of the Hot-Dip Galvanizers Association near you who will be glad to discuss rust and corrosion prevention—for his name and address write: American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pennsylvania.

For the best Zinc Coating **use hot-dip GALVANIZING**

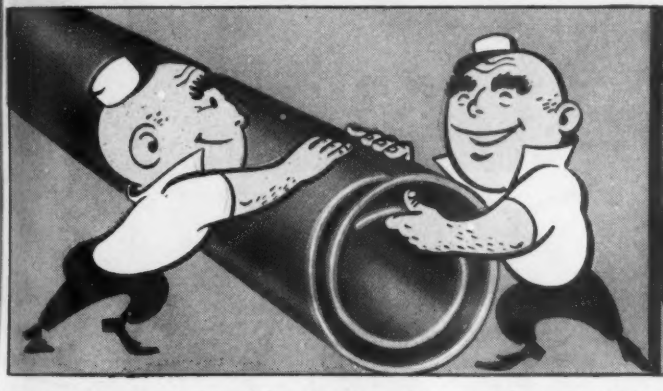
INSIDE STORY OF BUNDYWELD



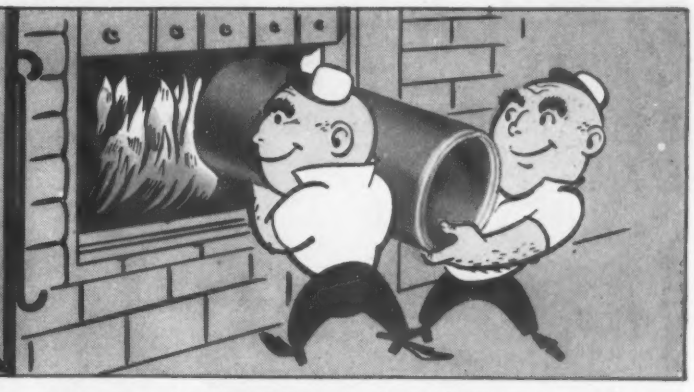
1 Bundyweld Steel Tubing is made by a process entirely different from that used in the making of any other tubing. A single strip . . .



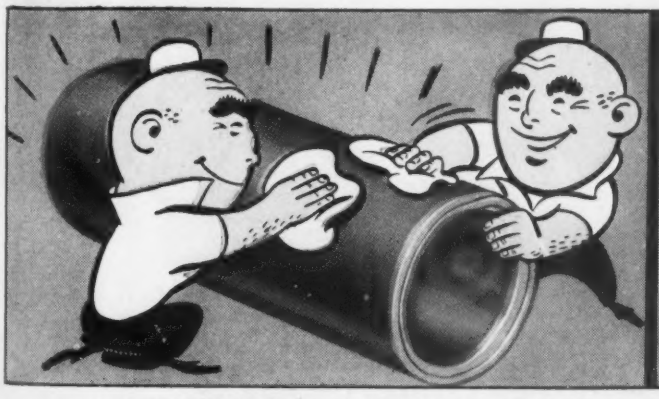
2 . . . of copper-coated S.A.E. 1010 steel is *continuously* rolled twice around *laterally* into tubular form. Walls of uniform thickness and concentricity . . .



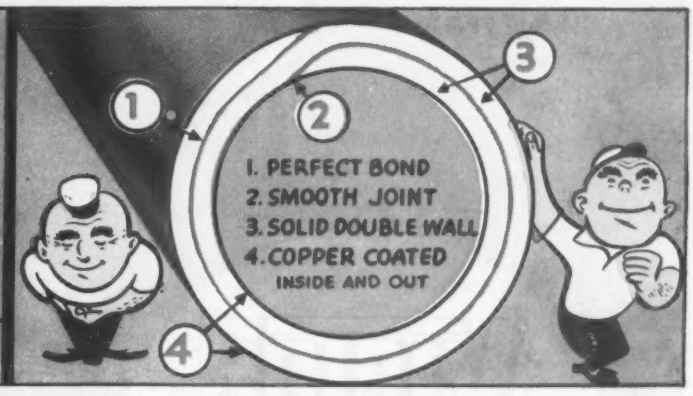
3 . . . are assured by the use of close tolerance cold rolled strip. This double rolled strip in tubular form is next passed through . . .



4 . . . a brazing furnace, where the copper coating fuses and alloys with the double steel walls. After brazing and cooling, the tubing has become . . .



5 . . . A SOLID double wall steel tube completely copper brazed throughout 360° of wall contact, copper coated inside and out, free from scale and closely held to dimensions.



6 Bundyweld is furnished hard or annealed in a wide range of standard diameters and gauges up to 5/8" O.D. Special sizes, cold drawn as desired. Also furnished in Monel.

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AD 109

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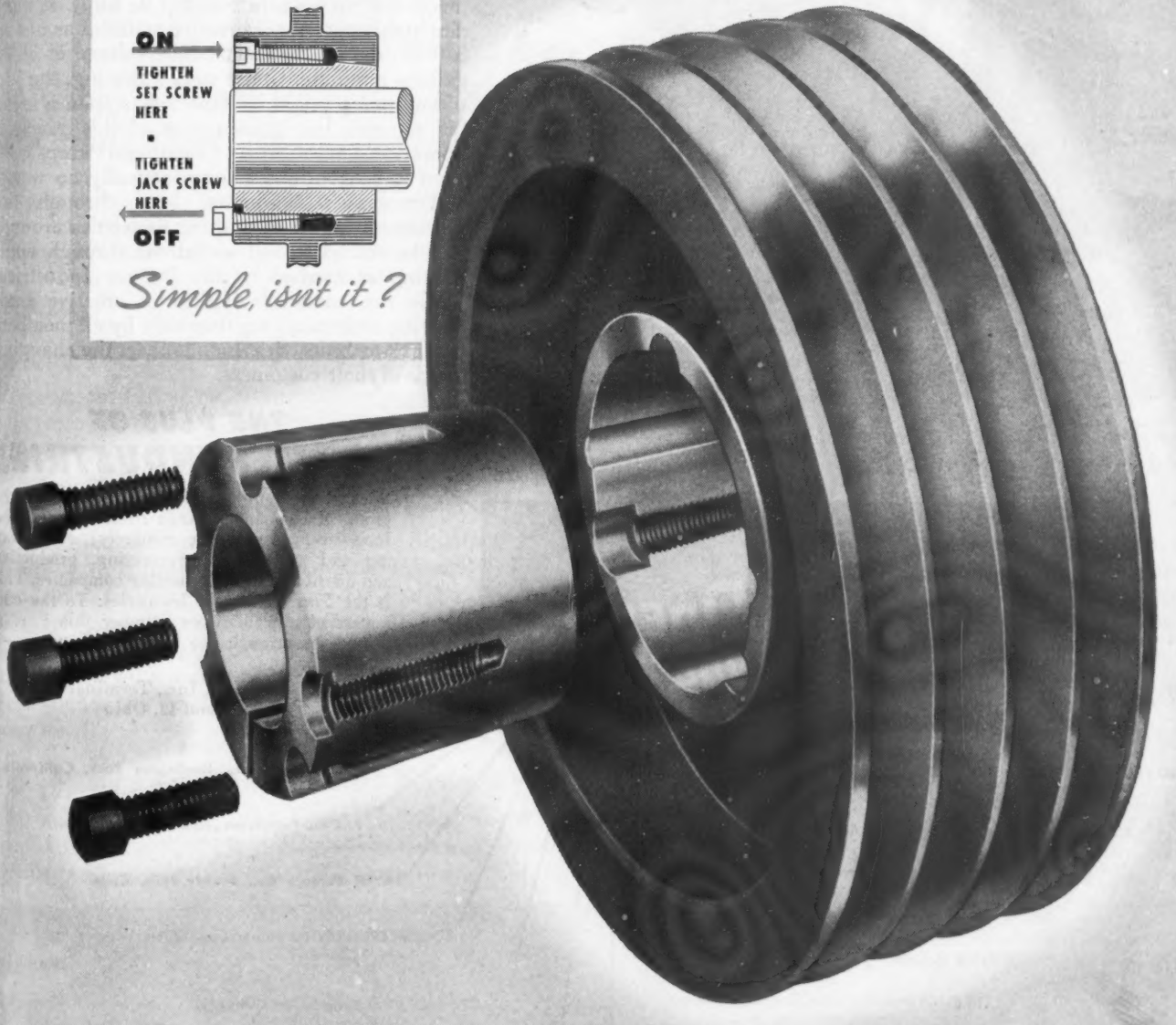

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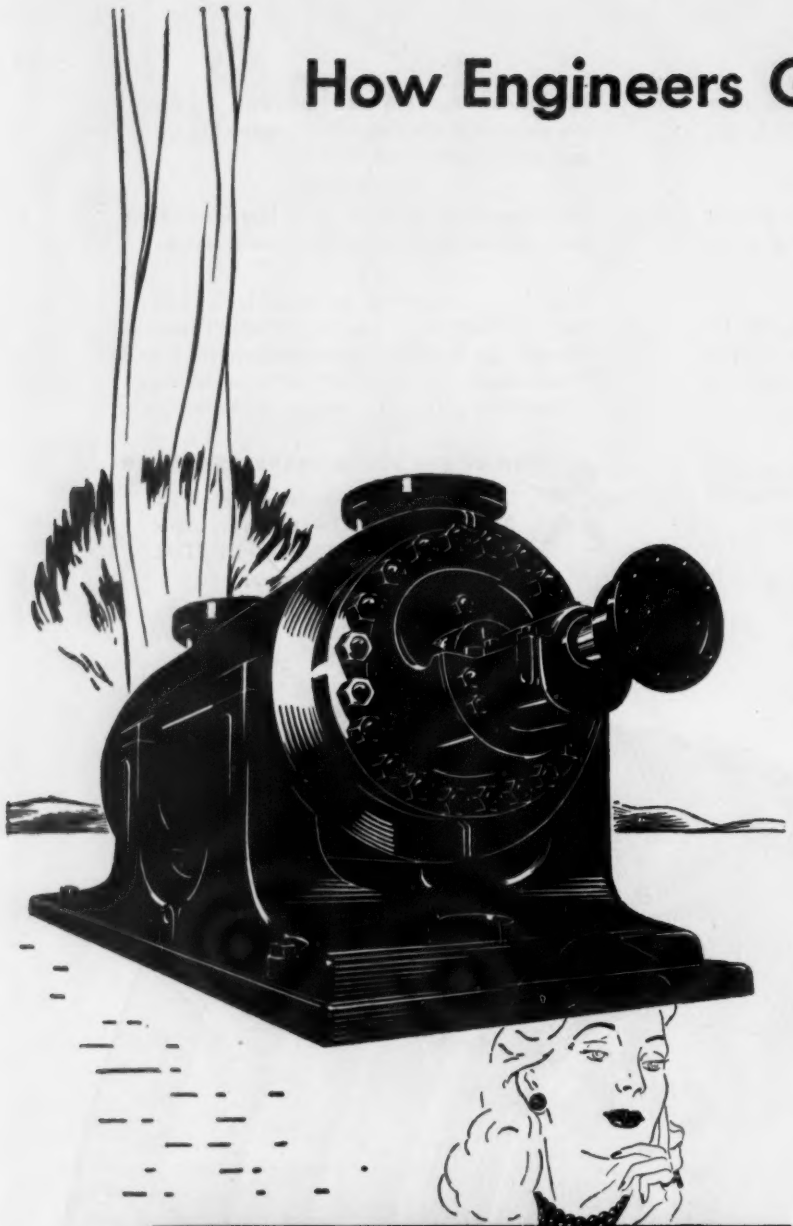
How Engineers Got To A Lady's Lip



Out of oil have come utterly unlike and surpri ing things—drugs, floor wax and such unsu pected glamourizers as perfume, lovely bead and even lipstick. Designing and building the machines for the job was the problem pitched at the engineers of Pacific Pumps, Inc.

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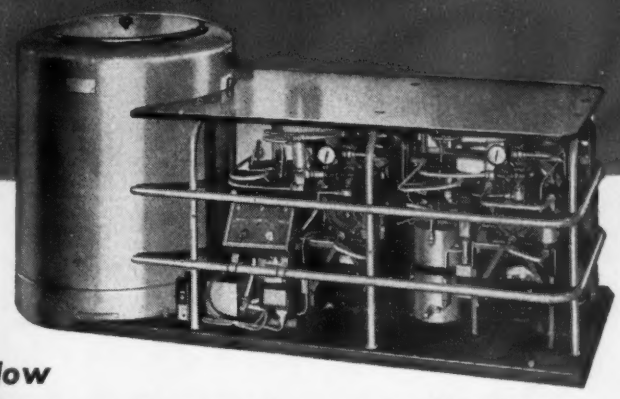
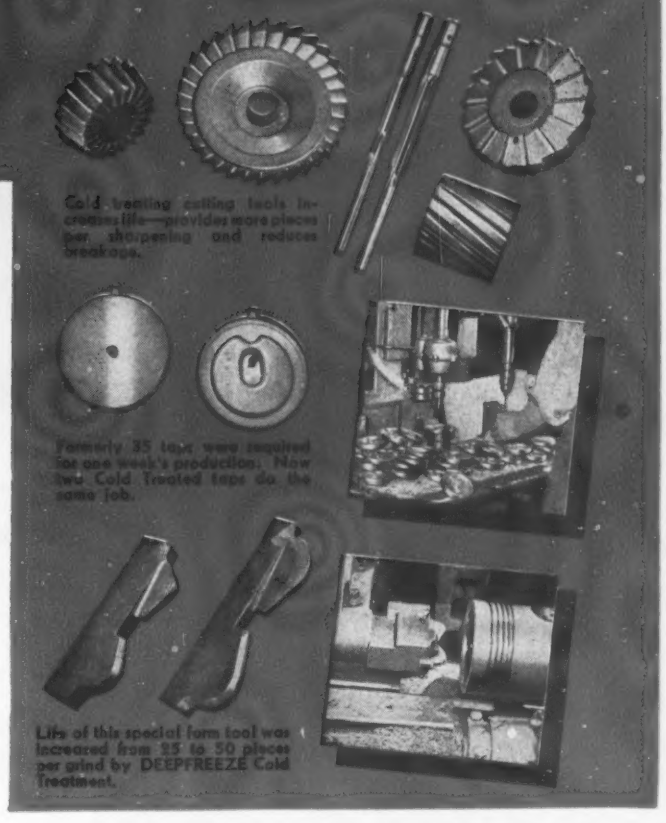
3 to 1 increase in Tool Life

by Cold Treating in a Deepfreeze Industrial Chilling Machine . . .




Cold treating cutting tools increases life—provides more pieces per sharpening and reduces breakage.
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Life of this special form tool was increased from 25 to 50 pieces per grind by DEEPFREEZE Cold Treatment.

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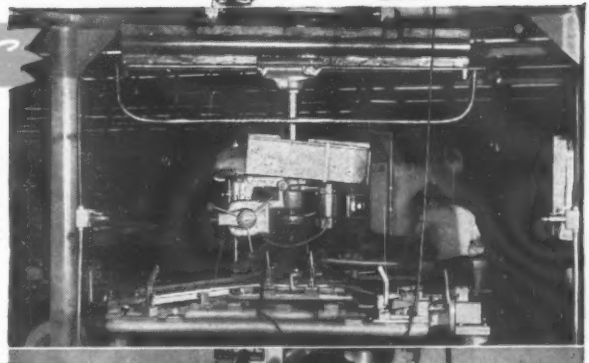

Fast positioning and wide range of speeds make W-T Radial Drills ideal for this job at the plant of a large aircraft builder.

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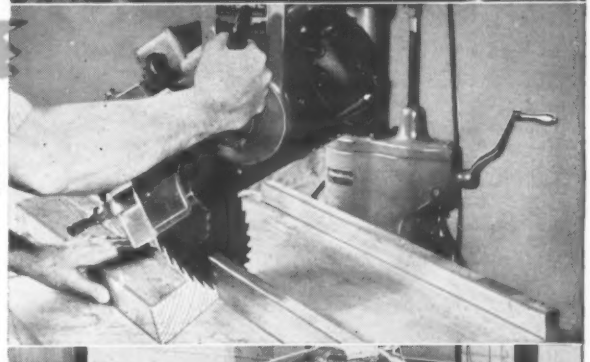

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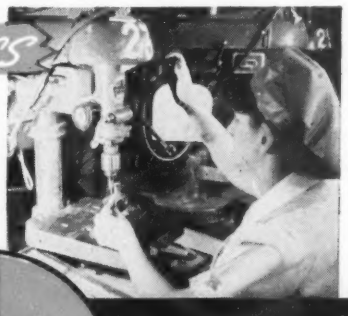

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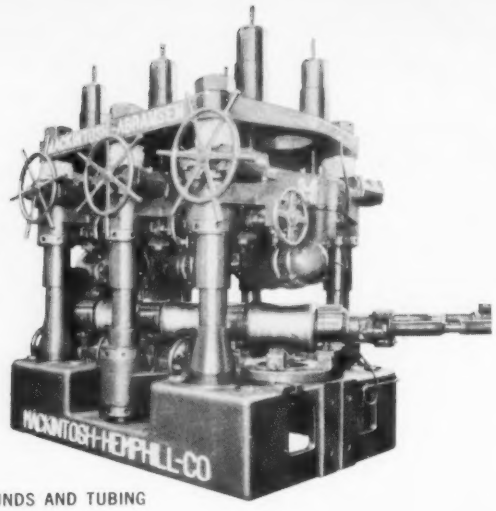

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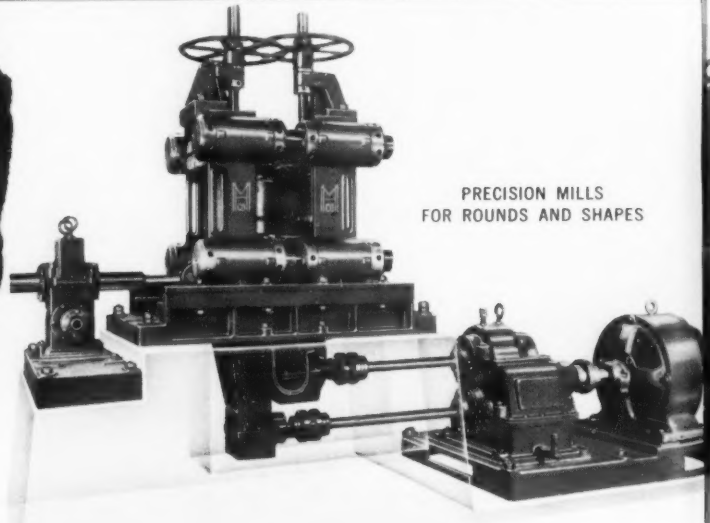
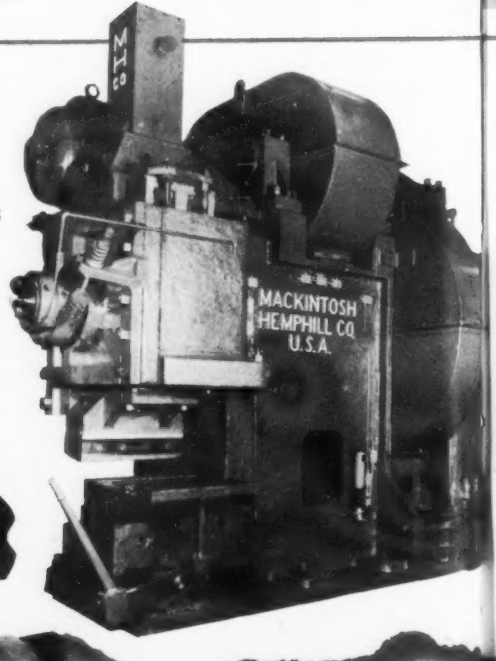
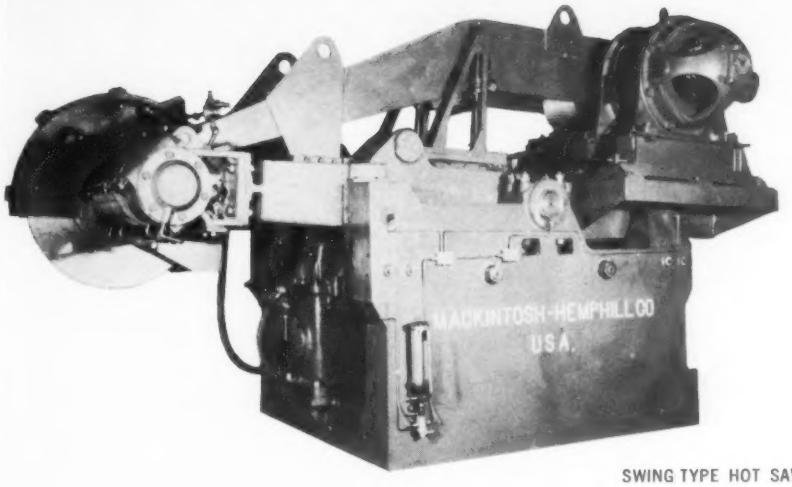


PRECISION MILLS
FOR ROUNDS AND SHAPES

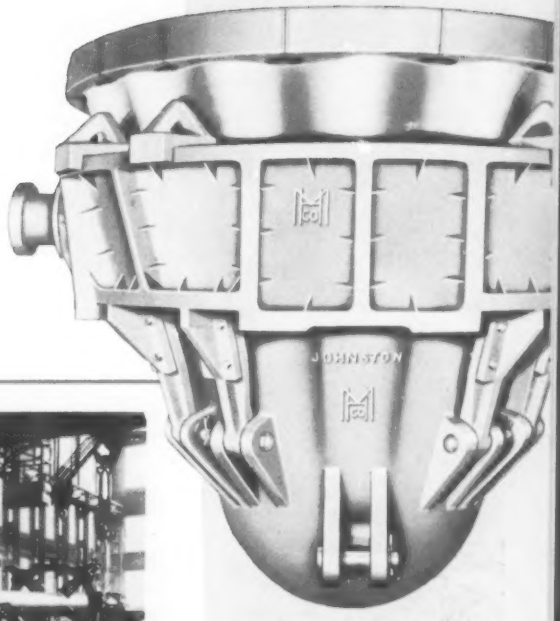


BAR, BILLET
AND SHAPE SHEARS

Makers of the rolls with the red wabblers



SWING TYPE HOT SAW



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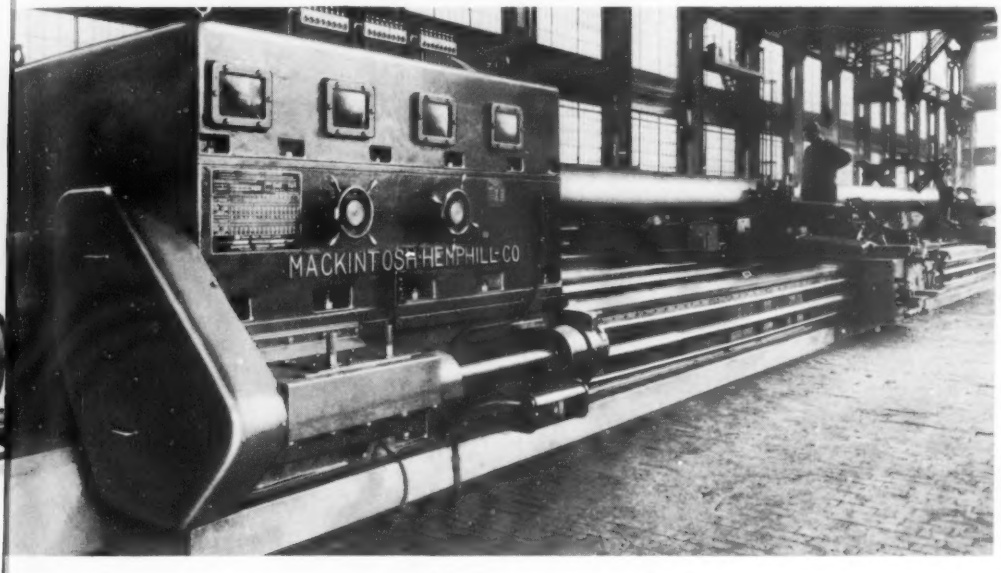
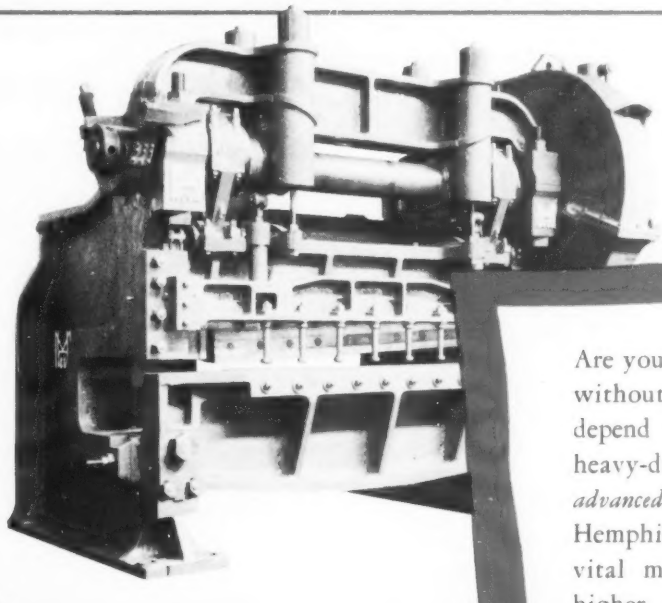


HEAVY DUTY ENGINE LATHES



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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117 No. 5 July 30, 1945

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Heat Treating Magnesium Alloys for Maximum Physicals

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STEEL
July 30, 1945

Accent on Research

This nation is on the threshold of a new era in scientific and industrial research. Today the importance of research to a healthy economic and social order is more widely recognized than ever before. As a result, movements are on foot to expand research facilities during the postwar period to proportions which a few years ago would have seemed fantastic.

Evidence of the new interest in promoting scientific development has been mounting steadily. Not long ago, General Electric announced plans for a new research laboratory to be built as soon as materials and equipment are available. Last Tuesday General Motors revealed details of a new "technical center," a 350-acre layout of research and development laboratories costing $20 million, to be constructed as soon as regulations permit. These are conspicuous examples of numerous privately-initiated expansions of research activity announced or soon to be announced.

This spurt on the part of industry is matched by a heightened interest in research in government quarters. Earlier this month Dr. Vannevar Bush, director of the Office of Scientific Research and Development submitted an exhaustive report to the President recommending the establishment of a National Research Foundation to promote a national policy for scientific research and scientific education. At present at least five bills providing for extensive promotion of research by the government are pending in Congress. These are the bills proposed by Senators Kilgore, Byrd, Magnuson and Fulbright and Representative May.

This evident determination of leaders in industry and government to rely more heavily upon research in the future is encouraging. Especially gratifying are the decisions of so many industrial corporations to increase their investments in laboratories and research personnel by substantial amounts. These are proof that industry has found research to be necessary to the development of a profitable business. The more private enterprise can justify expenditures for research, the better.

However, this does not hold true for the participation of government in research. Every sensible person will grant that there are functions in connection with encouraging scientific progress that could be undertaken by government with great benefit to the nation. At the same time, a program which places government in a too dominating position in research or tends to regulate private research could be a serious handicap to technological progress.

Every industrialist, engineer and scientist should become interested in the research bills now before Congress to the end that they will be considered intelligently when they come up for debate in the fall.

LABOR AT THE HELM: Results of the British election give Americans something to think about. The sharp swing leftward which places the Laborites in power reflects unrest that is prevalent in many countries. Americans cannot well ignore this trend. It should be of particular interest to a minority in this country, including some industrial leaders, which thinks that now is an opportune time to precipitate a head-on attack against radical and labor elements.

To these die-hards who cannot believe the regime of extreme conservatism is gone forever, one might point out that the Labor party in England won its victory on a campaign to nationalize fuel and power, inland transport, the iron and steel industries and the Bank of England.

We have not yet suffered nationalization in the United States to anywhere near this extent. This may be due partly to the fact that since 1932 we have been pandering so much to the elements of

(OVER)

unrest that we have dulled the weapons of the proponents of extreme nationalization.

Historically labor is less radical when bearing the responsibility of government than when campaigning for votes. This may prove true of the Attlee government. Meanwhile our cue is to work hard in our own country to nourish the present faint trend of public opinion toward the right.

• • •

SUPER-MECHANIZATION: Probably every manufacturer has dreamed of an opportunity to build a plant for a given product with complete freedom as to layout and selection of equipment. It is not clear how much freedom of action was permitted in installations at the Ashland and Detroit plants of the Clayton & Lambert Mfg. Co. for making 40 mm. steel shell cases, but the results are models in the efficiency of extreme mechanization.

The cases are made from 4½ in. diameter disks of ⅝-in. SAE 1025 steel plates. A cold-cupping operation, seven cold draws, heading and three tapers, with four intermediate annealing and trimming operations, are required. Serving the presses and furnaces performing these operations are miles of overhead monorail systems and belt, chain-on-edge and gravity roller conveyors. Another feature of these unusual plants is an exceptionally close tie-in with the steelmaker who supplies the plates.

Plants which have demonstrated high efficiency on war jobs will afford valuable pointers for mechanization in peacetime manufacture. —p. 82

• • •

AID FOR RECONVERSION: Industrial corporations will improve their cash positions by an amount estimated at $5 billion as a result of the interim tax bill passed by Congress and awaiting the signature of the President.

Provisions of the bill include an increase in the excess profits tax exemption from $10,000 to $25,000, effective Jan. 1, 1946; permission to use the 10 per cent tax credit on 1944 and subsequent taxes as current payment for taxes due; permission to convert postwar tax refund bonds representing credits for 1942 and 1943 into cash after Jan. 1, 1946; and speeding up refunds on operating losses, unused excess profits credits and recomputations on deductions for amortization of war facilities built with private funds.

This relief will be appreciated, particularly by smaller companies. At the same time, the ease with which this bill went through both houses reflects the present mood of Congress to assist industry meet reconversion problems. —p. 51

SIGNS OF THE TIMES: Belief persists on the West Coast that around Aug. 1 RFC will announce terms for refinancing the loan of $111 million to Henry Kaiser on his Fontana works. It is indicated (p.52) that the loan may be written down by about $40 million. . . . Highlights in the week's news in motordom were announcements of the entry of Mr. Kaiser into automobile manufacturing and the revelation of General Motors' plans for a "technical center." A new company (p.53), to be known as the Kaiser-Frazer Corp., will manufacture the Kaiser, a large, lightweight, low-priced car and the Frazer, a larger, medium priced automobile. . . . The GM technical center, covering 350 acres (pp. 64, 76), will consist of a 7-acre lake surrounded by a large administration building, research laboratories, process development, advanced engineering and other buildings. The entire layout will be outstanding in architectural conception. . . . . New automobile models recently unveiled are the 1946 Oldsmobiles (p. 63) and the civilian jeep (p. 64) of Willys-Overland Motors. . . . The report on the guaranteed annual wage requested by the late President Roosevelt will not be forthcoming for a long time. The committee in charge of the report has engaged two economists to pursue studies of the problem (p. 55) who believe it will take from 6 to 18 months to reach sound conclusions. . . . A Lockheed engineer, talking to the Los Angeles Junior Chamber of Commerce (p. 70) envisioned a jet transport "traveling above the speed of sound, 10 miles above the earth—no noise, no vibration, no sense of speed." This plane, he said, will not be built immediately. It is "10 to 15 years away". . . . British steelmakers have launched a five-year modernization program (p. 54) which, if it survives the Laborites' campaign promise to nationalize iron and steel, would increase steel ingot capacity 20 per cent. The cost of the program is estimated at $480 million. . . . Meanwhile, reports from abroad hint that the Big Three, meeting in Potsdam may act favorably on a proposal (p. 55) to reduce Germany's steelmaking capacity from an estimated 27 million to 10 million tons annually. . . . Editor E. C. Kreutzberg, reporting on impressions gained on an extensive tour of U. S. Navy bases in the Pacific (p. 75), says that standardization has made a great hit with servicemen. They will return home ardent exponents of the interchangeability of parts.

E. L. Shaner

EDITOR-IN-CHIEF

An Inland scarfer at work on a 12" x 12" bloom.

Inland "Flame Throwers" Help Make Better Steel

Scarfing with oxy-acetylene is an important procedure at the Inland mill because it helps to assure a satisfactory surface. In some cases rolled forms, such as the blooms shown above, are hand scarfed before shipment. In other instances the steel is automatically scarfed while hot and while it is still in the mill. Examples of mechanical scarfing can be seen at the Inland blooming mills, where slabs and blooms, at rolling heat, are scarfed by clusters of oxy-acetylene torches. These then pass on to continuous sheet and strip mills.

Scarfing is one of the many modern methods used by Inland to produce quality steels.

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INLAND STEEL

How Ryerson Assures Alloy Steel Quality

Each alloy shipment is personally inspected and tagged as a part of a rigid quality control system, which we call the Ryerson Certified Steel Plan. This plan covers: selection of the individual heats of alloy steel, the testing of samples from each heat, the positive identification of every alloy bar with stamped heat symbol and painted color markings (or with metal tags), and a Ryerson Alloy Steel Report, which is sent with each shipment. This report shows complete test information for the particular heat of steel used in filling your order. It contains: chemical analysis, recommended working temperatures, the Jominy hardenability results, and an interpretation of physical properties for 1, 2, 3 and 4 inch rounds quenched and drawn at 1000°, 1100° and 1200° F. The report serves as positive identification, a check on quality and as a guide to satisfactory heat treatment.

The Ryerson Inspection Tag symbolizes the final culmination of our quality controls, because it places a personal responsibility on us for the fulfillment of every specification in your order. This is the Ryerson way of making sure that you get the right steel. Ryerson alloys all receive the same systematic care. Call Ryerson for alloy steels, or for any other type of steel, and be assured of uniform quality and prompt action.

RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston

Industry-sponsored Victory Gardens are contributing substantially to the nation's larder. In the illustration above, employees of the Carnegie-Illinois Steel Corp.'s Irvin works, in the background, are shown caring for 25 x 25 ft plots provided by the company

Look to Manufacturing Industry for Aid in Boosting Food Production

Feverish efforts being made to enlarge output of equipment for farms and food processing plants. More steel available. Industry-sponsored Victory Gardens contributing substantially to nation's larder. European relief needs heavy

SOME civilian belt tightening is in prospect over coming months. How many notches will have to be taken up will depend upon the success attending feverish efforts being expended to increase food production. For a food shortage is staring the world in the face necessitating conservation to a degree not required before.

In his recent report as director of War Mobilization and Reconversion, Fred M. Vinson attributed the tight situation in domestic food supply to four major factors: (1) Production will decline this year for the first time since the war began. (2) Military demand is still rising, particularly because supply lines to the Pacific are longer, thus calling for more food to fill the "pipe line." (3) Relief needs in Europe are expanding sharply. (4) The United States ate too much in 1944 and the first half of 1945; at one time it appeared surpluses of some foods might develop, hence allocations to consumers were increased beyond what subsequent production justified.

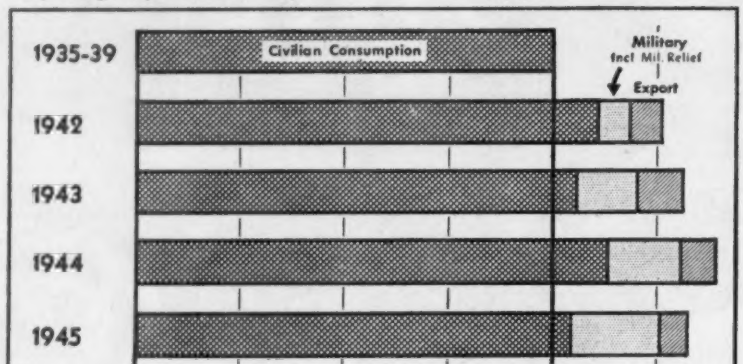
Last year food production reached an all-time high, rising 38 per cent above the prewar average (1935-39). This increase was attributable to greater acreage, larger use of commercial fertilizer, increased mechanization of farm operations, and more intensive cultivation. Weather conditions, also, were favorable. As a result, per capita food consumption was 10 per cent above the prewar average, though some products, such as butter and beef, were at times in short supply.

This year, per capita food supply for civilians is expected to fall from 5 to 7 per cent below 1944. However, the total will still be 2 to 4 per cent above the prewar average, though the quantity available in the last six months of the year will fall under the prewar average because, as Mr. Vinson said, "we ate a disproportionate share of our total supply in the first six months."

Meat supply will be down about 10 per cent from last year largely because of a 20 per cent drop in pork produc-

PERSPECTIVE ON FOOD

Despite high exports and military allocations, civilian supply is still above 1935-39.



tion attributable to feed shortages. Sugar will be tight, the supply of edible fats and oils is likely to be down 13 per cent this year. At the same time production of a number of important foods will be up compared with 1944, such as milk, fresh and frozen fish, and some fresh vegetables. Wheat crop is expected to approximate last year's record output but a drop of 500 million bushels in the corn crop has been predicted by Secretary of Agriculture Anderson.

With liberated Europe in desperate need of food, relief must be forthcoming from this country if actual starvation is to be averted in that unhappy part of the world. Some European countries cannot even produce sufficient food for a meager subsistence diet for their people. Since the first of this year the rate of U. S. relief shipments to Europe has increased sharply, and while this country cannot be expected to feed the world, nevertheless, it is clear the burden of relief for the war devastated areas will rest largely with us until Europe is able to get back on her feet. Aside from humanitarian considerations, political expediency dictates extension of relief to war-stricken areas on a broad scale.

Naturally, one is prompted to ask what is being done to improve supplies. Here are some of the steps being taken: Food goals for 1946 are being set at continued high levels; the War Production Board is increasing the flow of steel and other critical materials for the manufacture of farm machinery, food processing equipment and supplies; food handling facilities on the Pacific Coast are being enlarged and modernized to relieve civilian food distribution in that area from the pressure of military shipments; the Foreign Economic Administration is intensifying its efforts to locate and utilize available supplies in other parts of the world; conservation is being encouraged on every hand.

Chief hope for overcoming the problem, however, rests in expanding domestic production. Here, manufacturing industry is playing a major role through increased output of equipment and supplies for the farmer, the food processor and food handler.

Despite curtailed steel and raw material supplies, labor shortages and other factors, production of farm machinery and equipment through the war years has been maintained at a substantial rate. Survey by the Cleveland Federal Reserve Bank points out that during 1944 agricultural and machinery manufacturers received an estimated 1,095,000 tons of steel mill products. They received 713,000 tons and 570,000 tons in 1943 and 1942, respectively. With the exception of 1941, states the bank, the steel shipped to farm equipment companies in 1944 was the largest tonnage recorded since 1937. Peak in steel shipments to the industry was in 1929 when a total of 2,100,000 tons was received.

May Use 1,300,000 Tons

Allocations of steel to the implement industry for the third quarter of 1945 total 348,598 tons. The industry had requested 468,000 tons for the period. For the fourth quarter larger tonnage is expected to be made available to the industry since WPB order L-257 has been revoked, thus permitting buyers to obtain additional unrated steel. If this should work out in practice, it is believed the industry's 1945 consumption may approximate 1,300,000 tons.

Efforts are being made to boost production of farm machinery and equipment 30 per cent above the levels scheduled for the year Aug. 1, 1944, to July 30, 1945. To attain this objective, additional manpower will be required as well as additional materials and components in quantities sufficient to meet the proposed schedules.

WPB recently stated that only tractor production is approximately on schedule, while other items of farm machinery and equipment are anywhere from 7 to 28 per cent behind schedule.

Not only is additional farm machinery required to meet the demands of the food program, but replacements are urgently needed for worn-out food processing machinery.

WPB recently reported screened requirements for this type of machinery and equipment for the third and fourth quarters of 1945 and first and second quarters of 1946 have been estimated in dollar values at $120 million. The backlog of orders on the books of manufacturers is approximately $70 million not including postwar orders. Deliveries are being made to the processors at the rate of a little less than $9 million per month, leaving a backlog of rated orders of approximately eight months. At this rate, the industry will fall short of the minimum essential requirements by more than $12 million. Increased production will be possible only if existing machinery plants are able to employ more skilled workers. The following industries are reported particularly in need of help: Baking machinery, canning plant machinery, cereal manufacturing machinery, dairy and milk products plants machinery, meat packing machinery and equipment, sugar mill processing equipment and machinery and animal, fish and vegetable oil machinery and equipment.

Last week WPB granted increased authorization for production of food processing machinery in the third and fourth quarters of 1945.

Victory Garden Idea Spreads

Manufacturing industry's tremendous achievement during the war, building ships, tanks, guns, and other munitions, is well known, but its contribution in increasing the nation's food supply through employee Victory Gardens has not received the notice it merits. Today, near industrial plants all over the country, along railroad tracks, in back yards, vacant lots, industrial workers are producing vitally needed food. The garden idea has spread to every type of industry and business.

Marvin Jones, recent War Food Administrator, summed up the industrial garden situation in a letter sent to Edward J. Condon, president, National Victory Garden Institute. He wrote:

"With more than 40 per cent of the nation's fresh vegetables produced last year in Victory Gardens, you can appreciate the relief this gave our heavily taxed transportation system and the savings in containers, paper and other critical war materials used in the shipment of fruits and vegetables. The saving of transportation is extremely important, but it is only one of many obvious advantages of Victory Gardens in the national war effort."

From the time of its formation in 1942, the National Victory Garden Institute has acted as a clearing house for information in setting up organizational work, furnishing posters and bulletins on

(*Please turn to Page* 152)

Munitions Output Cut in June; Cutbacks Down from May Total

MUNITIONS production in June continued its gradual decline from the March peak, the War Production Board reported last week. Total output, $4,285,000,000 (preliminary) was 7 per cent below May, more than half of the decline reflecting the fact there was one less working day in the month.

Total change from March, the last month of full two-front war production, was only 12 per cent, but if allowance is made for a shorter month, the decline was only about 9 per cent.

Present schedules call for acceleration of the downtrend during the current quarter and then a slowing down in the rate of drop. However, with the production rate by December scheduled to be 32 per cent below March, the average decline for the remainder of the year will be at approximately the $200 million-a-month rate of reduction in the quarter just ended.

June production had been scheduled to fall 5 per cent from May, and output fell about 2 per cent short of schedule. Most of the shortages were in programs which are to go down much further.

Employment dropped by 270,000 workers from May to June, or about 3 per cent.

Most of the programs which were scheduled to increase did move up, but many of them failed to advance to the extent scheduled.

MUNITIONS PRODUCTION—JUNE

	June Preliminary Millions of Dollars	% Above or Below May Actual	% Above or Below June Schedule
Aircraft	1,034	—10	—3
Ships (Incl. Maintenance and Repair)	736	— 5	—1
Guns and Fire Control	194	—13	—3
Ammunition and Bombs	574	—16	—4
Combat and Motor Vehicles	405	— 8	+3
Communication and Electronic Equipment	297	— 5	—3
Other Equipment and Supplies	1,045	+ 1	—2
Total Munitions	4,285	— 7	—2

War contract cutbacks reported to the WPB Production Readjustment Committee, which reached a dollar value of $7,668,472,000 in May, fell to $3,478,591,000 in June. For the first six months of 1945, reductions in contracts processed under PRC procedure totaled $16,300,000,000 and affected nearly 2500 war plants.

While dollar volume of these cutbacks has shrunk, the impact is proportionately greater, PRC chairman John Martin said, because almost all of them affect actual production. Whereas 31 per cent of contracts cut back in April and 14 per cent in May were "paper," or cancellation of production that was scheduled but not actually begun, the comparable figure for June is only 5 per cent.

About $2,204,135,000 worth of the June total represented reduction in 1945 production and $1,274,456,000 in 1946 schedules. Affected were 972 plants, of which 365 would release labor because of the June cutbacks to estimates given to PRC.

Republic Steel To Expand Capacity for Cold-Rolled

To meet anticipated substantial increase in demand for cold-rolled sheet and strip steel, Republic Steel Corp. has announced plans for expanding its capacity at Cleveland.

Expansion will take place at the 98-inch strip mill in the Upper Cuyahoga valley and will total almost 50,000 sq ft of additional floor space and give Republic an added annealing capacity of 10,000 tons per month over its present capacity of 33,000 tons per month.

Plans call for two separate extensions to the cold mill building to house coil and sheet annealing furnaces. The coil furnace building will be 105 x 240 ft and the sheet annealing extension will be 105 x 120 ft.

There will be seven coil annealing furnaces, each capable of handling stacks of coils 12 ft high, and two additional sheet annealing furnaces.

CPRB Schedules Conference On Standards Unification

A conference between the United States, Canada and Great Britain on unification of engineering standards and practice will be held in Ottawa, Canada, on Sept. 24, the Combined Production and Resources Board announced recently.

Present, Past and Pending

■ DR. W. F. HESS AWARDED STEEL INSTITUTE MEDAL

WASHINGTON—American Iron & Steel Institute medal for 1944 was awarded last week to Dr. Wendell F. Hess, professor of metallurgical engineering, Rensselaer Polytechnic Institute, Troy, N. Y., for his paper, "Recent Progress in the Scientific Application of Welding to Steel."

■ LABOR STRIFE INCREASING IN CHICAGO DISTRICT

CHICAGO—Strike of 2000 members of International Molders & Foundry Workers' Union (AFL) forced 39 foundries in this area to close down July 23. Strike of 10,400 workers at Chrysler Corp.'s Dodge plant here Wednesday forced closing of its machine shop, reducing output of Superfortress engines. About 500 workers in Inland Steel's tin mill are defying a union order to halt a strike begun last Tuesday.

■ FOY AND FRANCIS LEAVING STEEL DIVISION, WPB

WASHINGTON—Norman W. Foy, steel consultant to WPB Chairman J. A. Krug and former director, Steel Division, is leaving War Production Board. Harry M. Francis, deputy director of the division, also is leaving to return to American Steel & Wire Co.

■ 3365 AUTOMOBILES DISAPPEARING DAILY FROM HIGHWAYS

DETROIT—Between July 1, 1941, and July 1, 1944, total of 3,585,089 passenger cars disappeared from highways nationally, reports R. L. Polk & Co. Total U. S. passenger cars registered as of July 1, 1944, were 24,114,922. Daily rate of withdrawals is now 3365.

■ REPLACEMENT STEEL RAIL OUTPUT DROPS BELOW SCHEDULE

WASHINGTON—Output of new replacement steel rails dropped below schedule for the first half of 1945 but total for the year is expected to equal the 1,900,000 tons produced in 1944. Freight car output for first half was 24,176 cars, with 47,164 scheduled for 1945.

■ SHEET, STRIP STEEL GROUP ADVOCATES VOIDING CMP

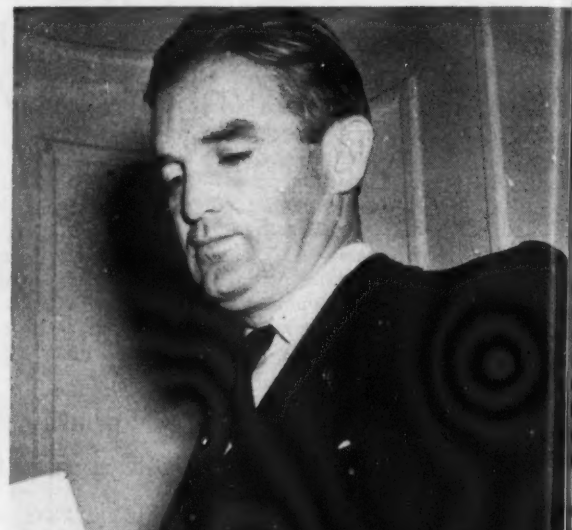
WASHINGTON—Members of Sheet and Strip Steel Industry Advisory Committee have informed WPB a substantial increase in types of sheet and strip steel most urgently needed for reconversion could be obtained through immediate elimination of the Controlled Materials Plan.

■ STEEL CASTINGS SHIPMENTS DECLINE IN MAY

WASHINGTON—Total shipments of steel castings declined 2 per cent in May to 186,376 short tons compared with April and declined 11 per cent compared with May, 1944, reports Bureau of the Census.

Sale of Leftovers Is Becoming Vast Merchandising Job

Army-Navy Liquidation Commission chairman outlines scope of problem of disposing of overseas surplus, expected to embrace some 4 million different items. OPA formulates program to aid resellers determine price ceilings



W. STUART SYMINGTON

PROBLEM of disposing of surplus war materials is developing, as anticipated, into a vast and complicated merchandising job and is rapidly making the United States government the world's largest dealer in general merchandise.

In this country, thousands of surplus military items are being offered for sale in warehouses and showrooms from coast to coast. Practically anything, from mess kits to steel plants, from paper clips to ocean-going cargo vessels and heavy bombers have been or soon will be placed on the block.

Many of these items, which at first glance would appear to have little or no civilian use, are ingeniously converted into useful items. Snowshoes form unique cocktail tables; glider fuselages become tourist trailers, ammunition containers become tool boxes, etc. To date about $150 million of surplus property has been sold.

Even more complex than the task of disposing of surplus goods held in this country is that of selling surplus located outside the United States. Overseas surplus and residue disposal is being handled by the Army-Navy Liquidation Commission, headed by Thomas B. McCabe, chairman of the board, Federal Reserve Bank, Philadelphia, and on leave as president, Scott Paper Co., Chester, Pa. In a recent statement to W. Stuart Symington, chairman of the Surplus Property Board, Mr. McCabe indicated the scope of the overseas surplus disposal problem.

At present, Mr. McCabe points out, no accurate accounting of the amount of overseas surplus is possible, although the scope of the job is indicated by the fact that eventually it will embrace all the 4 million items it takes to fight a war—enough to fill 50 mail order catalogs.

"In determining disposal policies and procedures," says Mr. McCabe, "we must bear in mind the following considerations:

"Obtaining the most advantageous return for the American taxpayer.

"Making no sale which might endanger the future peace of the world.

"Seeing that supplies sold overseas are not dumped on our domestic markets.

"Helping to develop our export market so as to contribute to more jobs in postwar America.

"Recognizing economic conditions in the countries where surplus is located.

"Decentralizing operations so as to cut red tape and act without delay."

Where dollars or dollar exchange is available, the ANLC will sell as much surplus as possible for immediate cash payment. The availability of dollars in most countries where the surplus is located is, however, limited and the extent to which foreign currency will be accepted in payment will be a question of policy to be worked out by the Treasury and State Departments.

"It is possible," opines Mr. McCabe, "that rights and concessions — certain intangibles that will lead to trade developments and friendlier relations with foreign countries — may prove to be of greater value than financial obligations that would have to be paid off over a period of years. Every proposal of this kind will be thoroughly considered and submitted as it arises to those United States agencies authorized to accept it."

American foreign policy dictates that munitions of war shall not fall into the hands of potential enemies. Only as the State Department and the military authorities concur will any arms, ammunition and other weapons be sold to foreign countries. Most surplus of this type probably will never be offered for sale as such.

Another consideration is the effect of sales abroad on our domestic economy. ANLC does not want to sell surplus overseas to be returned to this country and dumped on the domestic market if that is going to endanger jobs and business in postwar America.

At present the law and regulations, with minor exceptions, prohibit the reimportation into the United States of surpluses purchased abroad, and the Customs Service is charged with enforcing this provision.

To assist in the recovery and rehabilitation of devastated countries, war surplus materials will be used by government rehabilitation agencies where feasible. This will reduce the demands on scarce shipping and supplies at home. For the same reasons, war surpluses will be made available to American religious, educational and philanthropic institutions abroad.

"We also want to contribute, if possible, to more jobs by helping American companies build up their foreign markets," says Mr. McCabe. "To accomplish this, American firms have been given the opportunity to rebuy their trade-marked products so that they will be in a position to protect their brands and to repair, service and distribute their merchandise in orderly fashion.

"It is for this reason that our sales principles must necessarily be flexible. The details will have to be worked out by our field commissioners who are on the ground and know local conditions.

"One further aim is to dispose of our supplies, equipment and fixed installations without delay, so that troops won't

have to be held abroad to warehouse and guard them and to avoid further deterioration and loss of value.

"Obviously, the field commissioners—who will do the actual selling of surplus — must have wide authority and independence of action, to carry out their assignments within the framework of policies and procedures determined here in Washington.

"I am happy to report that our program is under way. Field commissioners and their staffs have been established in the Mediterranean Theater of Operations, the European Theater of Operations and the Persian Gulf areas. The field commissioner for the Middle Eastern theater has been appointed and will leave to begin disposal in that area."

To prevent excessive charges to consumers for surplus goods offered for sale in this country and at the same time to provide resellers with simpler methods for figuring their ceiling prices, the Office of Price Administration has formulated a program which will have a triple effect:

1. Resellers no longer will be able to use the ceiling price of a "similar item," which in many cases has resulted in excessive resale prices for war goods bought at low prices.

2. The pyramiding of prices by "cross-stream" sales among identical types of sellers, with a mark-up added each time, will be checked.

3. Resellers will find it easier to determine their ceiling prices, either before or after they buy the goods, by being able to find out quickly what their dollar-and-cent ceilings are or what mark-up they can use.

The "similar item" method of pricing has not proved effective for surplus goods which the government in some cases has sold at extremely low prices.

Rules on "Cross-Stream" Sales

Three rules governing "cross-stream" sales are included in the order issued by OPA.

1. Resellers who have customarily sold cross-stream may continue to do so at mark-ups permitted by the order, provided they file a statement of the particulars with the regional OPA office.

2. Resellers may split their mark-ups with subsequent buyers of the same class, provided they notify such buyers of their maximum selling price and provided the final price to the next level of sale is not higher than it would have been if there had been no cross-stream sale.

3. In exceptional cases, OPA may approve cross-stream sales at customary mark-ups where necessary to get the goods distributed.

Where surplus commodities are not covered by specific OPA regulations, resellers in most cases take their percentage mark-up on a comparable commodity having the same general use that they sold in the year ended June 1, 1945.

Reconversion Tax Measure Worth $5 Billion to Business Approved

AN INTERIM tax bill intended to give corporations a form of quick relief from wartime levies and to better their cash position for reconversion activities by more than $5 billion has been passed by Congress and is expected to be signed by President Truman.

Principal consequences of the measure will be:

1. Beginning with the 1946 tax year, excess profits tax exemption will be increased from $10,000 to $25,000. This will reduce the number of companies subject to the excess profits tax from about 31,000 to about 19,000 and will reduce the excess profits tax total by about $300 million. However, since the income exempted from this tax will become subject to normal and surtaxes, the net revenue loss is expected to be about $160 million.

2. Ten per cent credit on the excess profits tax may now be used currently for tax liabilities of 1944 and subsequent years, so that corporations need not wait for refunds. This is estimated to mean about $1,540 million to corporations.

3. Corporations may cash their post-war tax refund bonds, representing credits for the years 1942 and 1943, after Jan. 1, 1946. This may amount to $1,300 million.

4. Refunds and carrybacks of net operating losses and unused excess profits credits will be speeded up, with benefits to business estimated at $1 billion.

5. Refunds from recomputation of deductions for amortization of war facilities built by firms with their own funds will be hastened, with consequences totaling another $1 billion.

A primary purpose of the bill is to improve the cash position of small companies so that they more easily can finance their reconversion to civilian production. Larger corporations, however, also will gain some benefits from the new measure.

Debate on the bill supplied a preview of some of the tax policies and battles of the future. Several representatives, for example, attempted to introduce amendments which would match corporate tax relief with relief for personal income taxation. They sought to boost the personal exemption and even to remove the tax entirely for workers with small incomes. This type of campaign is expected to be increasingly popular with some congressmen, although the administration has said it wishes to keep personal income taxes on a broad base, while easing corporate taxes in such a manner as to provide opportunity for full production and high levels of employment.

OPA Provides for Upward Price Adjustment in Warehouse Steel

SOME price relief is afforded steel warehouses which have been forced to absorb an increase (with certain minor exceptions) in maximum mill prices for certain iron and steel products which became effective on May 23 (See STEEL, May 28, p. 73). Office of Price Administration issued last week amendment 32 to revised price schedule 49 which provides for an upward adjustment of maximum prices in individual cases for warehouse products.

Applications for individual price adjustments must be submitted to OPA on form 674-2493, copies of which may be obtained from OPA, Metals Price Branch.

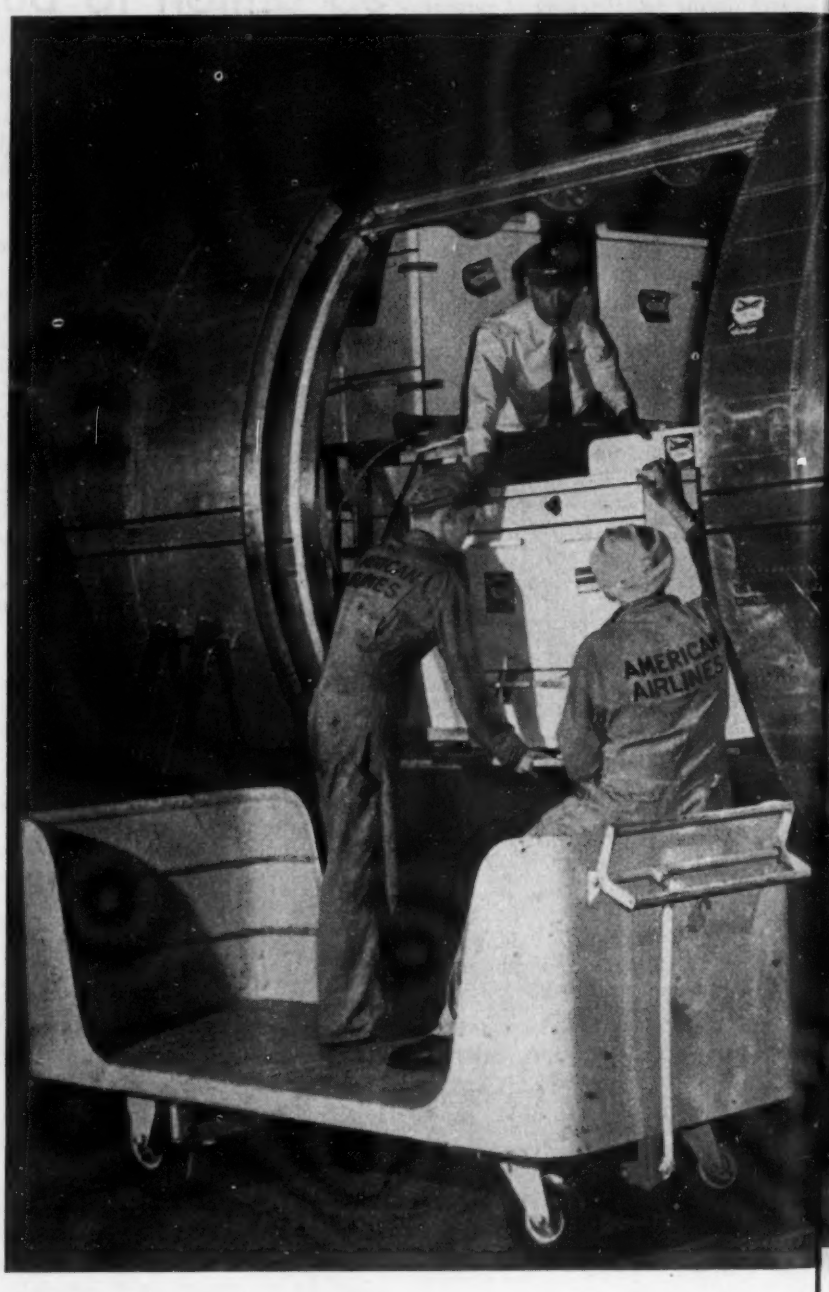
Some sellers have applied, since May 23, for individual relief on particular products on the ground that the mill increases either completely wiped out the warehouse spread or so reduced the margin as to create an operating loss. Schedule 49 contained no adjustment provision until the present amendment was issued which enabled OPA to grant any relief under such conditions to these resellers.

The adjustment provision will permit OPA to grant to an individual reseller an upward adjustment of his maximum price on a product or line of products by the amount of any industry-wide increase granted to his producer source of supply. The seller's resulting percentage margin cannot exceed, however, the heavy line steel distributing industry's operating cost as a percentage of total sales for the most recent calendar year (18½ per cent in 1944, based upon information presently available to OPA). Furthermore, the adjusted margin cannot exceed either the margin enjoyed by the seller for that product under normal marketing conditions, or that seller's total operating expenses as a percentage of his total sales in the most recent annual accounting period.

Where the adjustment by the full amount of the industry-wide mill increase would raise the seller's margin above any one of these three factors, the adjustment would be limited to an amount sufficient to bring the margin only up to the lowest of the three.

Writedown of $40 Million Expected

RFC refinancing terms thought likely to be made known around Aug. 1. Kaiser pushing proposed western steel syndicate. Industrialist declines to discuss in detail his postwar plans for the manufacture of various products



SAN FRANCISCO

PROSPECTS are Reconstruction Finance Corp. terms for refinancing the loan to Henry Kaiser on his steel plant at Fontana, Calif. will be announced around Aug. 1.

Indications are the agreement, believed to have been reached at recent conferences in Washington, will result in a writedown of about $40 million in the original loan of $111 million.

Mr. Kaiser is reported to have acquired rights to new iron ore properties in California recently, strengthening the view that an agreement has been reached on Fontana.

Meanwhile, there has been no announced change in disposal plans for the Geneva Steel plant in Utah. The Office of Defense Plants said it had received "no firm offers" for the purchase of Geneva, although conversations had been held with representatives of U. S. Steel Corp. and Colorado Fuel & Iron Corp., among others.

According to a recent report of a Senate Military Affairs subcommittee, further information must be obtained before a disposal plan can be announced.

"This plan must set forth with definiteness what disposal of the key government-owned plants is recommended," the report said. "The plan must be prepared in advance of disposal and on the basis of the objectives of the Surplus Property Act. It must not be confined to a mere listing of bids which may have been received and then suggest in each instance a choice of the lesser evil."

Kaiser Syndicate Discussed

Mr. Kaiser, by means of press conferences and speeches, is keeping alive active discussion of his proposal to form a "Kaiser Syndicate" of western interests for the purpose of financing lease and operation of the Geneva plant in conjunction with Fontana and other western metal companies. However, at this writing, he has received no answer from the RFC regarding the proposal.

With regard to the Kaiser-proposed tie-up between his syndicate, Colorado Fuel & Iron Corp. and Wickwire-Spencer Steel Co., Charles Allen Jr., chairman of the board of Colorado Fuel & Iron, said that he had discussed with Mr. Kaiser "the possibilities of their working together."

Mr. Kaiser declined to discuss in detail postwar activities in the manufacture of various articles that have been associated with his name, as well as related business expansions in industry such as steamship lines, at an interview in Los Angeles last week.

He declared that future programs hinge upon the outcome of his current organization of a syndicate just formed to expand western steel manufacturing. A. P. Giannini, of the Bank of America, he said had accompanied him on a trip to the Fontana mill but added that Mr. Giannini "promised nothing" pending outcome of Kaiser negotiations on full acquisition of the properties.

He described his proposals in general terms of a "Rocky Mountain arsenal" capable of producing and fabricating any and all articles in any and all metals "for use either in peace or war."

At one point Mr. Kaiser interrupted the interview to telephone J. B. Ordway, general manager of the Fontana plant, for figures showing the condition of business there. Backlog of orders, it was reported, will keep production at peak levels until the first of next year.

"The majority of our Fontana business now is for fabricators and manufacturers' jobbers," Mr. Kaiser said. "Very little i

n Fontana Steel Loan

Kitchen ranges are unloaded at Los Angeles after shipment by air from Chicago in a joint research project conducted by American Airlines and Consolidated Vultee Aircraft Corp.

represented by direct government purchases. The merchant bar mill is 90 days behind in deliveries."

Quoting key figures which he said applied to the postwar steel industry in the West, Mr. Kaiser asserted that ore is delivered at eastern mills for $4 to $6 a ton while at Fontana the average cost is $3. He disclosed that his company has reason to believe that a body of high grade ore lies in San Bernardino county within 100 miles of the Fontana plant and that drilling tests point to a known 100 million-ton deposit, with estimates ranging far above that amount.

Deploring what he termed "false reports" being circulated by enemies of steel industrialization in the West, Mr. Kaiser said: "Some have been saying that Henry Kaiser knows nothing about building ships and nothing about making steel, that he is neither a steel man nor a shipbuilder. I answer this by pointing out that our company has made good steel and good ships and has shown a fair profit in so doing."

Replying to a question as to what the mark-down should be in appraising the Fontana plant, he said he believed it should be $40 million, making the plant worth about $65 million, and he indicated this figure is included in recommendations already made by the newly formed syndicate. It will require, he said, about $40 million to convert the plant to peacetime production.

Kaiser, Frazer To Build Two New Cars

FORMATION of a corporation to build two new automobiles was announced last week by officials of the Henry J. Kaiser Co. on the West Coast and Graham-Paige Motors Corp., Detroit.

The company, to be known as the Kaiser-Frazer Corp., will have Henry J. Kaiser as chairman and Joseph W. Frazer, head of Graham-Paige, as president and general manager. Company will have a capitalization of five million shares of $1 par value.

One of the new cars will be called the Kaiser and is described as a large, lightweight, low-priced automobile to be built on the Pacific Coast at a location not yet announced.

The second will be called the Frazer and will be a larger, medium-priced car built in Detroit.

Kaiser officials said present plans call for the manufacture and delivery of the low-priced Kaiser early next year. Several types and models are being tested but Kaiser officials have not revealed any particular innovations or cost estimates.

Directors of the new corporation will include: L. Boyd Hatch, Atlas Corp., New York; Oswald L. Johnson of Simpson, Thatcher & Bartlett, New York; Walter Bienecke, president, John C. Paige & Co., New York; E. E. Trefethen Jr., vice president, and G. G. Sherwood, treasurer of the Kaiser Co.; and R. L. Bridges, San Francisco.

Reconversion of Industry On Coast Seen Delayed

Rapid reconversion of Far Western industry to civilian production is unlikely, the Federal Reserve Bank of San Francisco states in an analysis of current business and industrial trends.

Cutbacks of war contracts following defeat of Germany have been smaller, except in aircraft, than was expected. Employment in West Coast aircraft and shipbuilding plants is scheduled to decline further, but transfer of the major war effort to the Pacific theater is expected to increase the pressure on other western industries.

Government Acts To Foster Trade In Postwar Era

Recent congressional action prepares for immediate efforts to promote exporting and importing

RECENT actions by Congress, extending the Reciprocal Trade Agreements Act, approving the Bretton Woods agreements, and increasing the capitalization of the Export-Import Bank of Washington, have pretty well cleared the deck for immediate action by our government in making needed postwar trade arrangements with other countries.

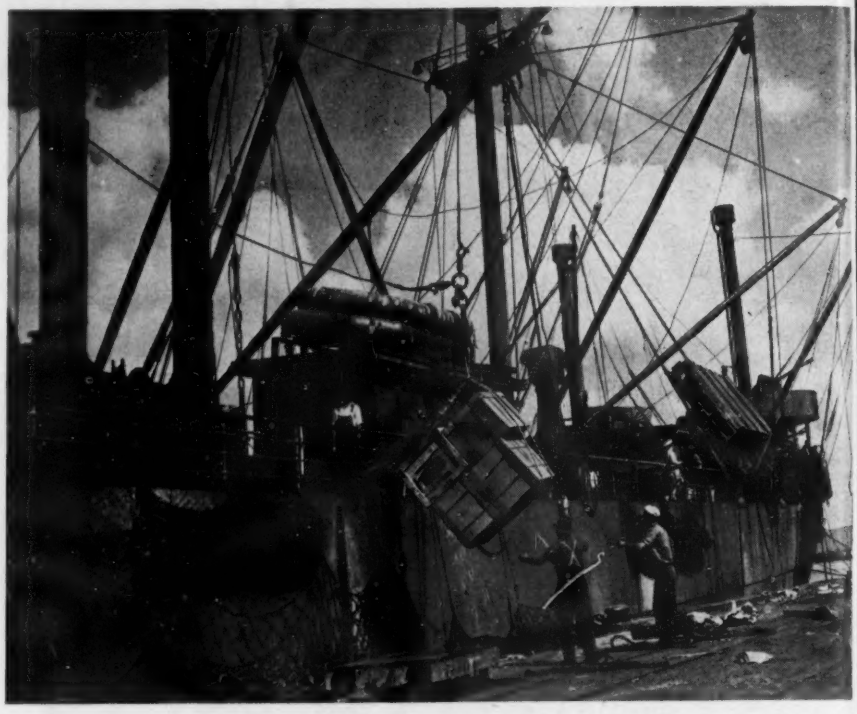
The only important action not yet taken is passage of the Fulbright bill which would repeal the Johnson Act ban on making private loans to foreign nations in default on their debts in this country. However, this lack is not regarded as serious since the legislation approving the International Bank and increasing the lending power of the Export-Import Bank carries provisions giving the Bretton Woods signatories access to our capital markets.

The increase in the Export-Import Bank's capital from $700 million to $3.5 billion clears the way for immediate financing of a large amount of business which foreign buyers are eager to place in the United States, including particularly heavy machinery needed by the U. S. S. R. and other countries for the manufacture of many kinds of consumer goods. The Export-Import Bank already is receiving loan applications from exporters, manufacturing exporters and representatives of foreign governments or private interests abroad.

Vast Business Sighted

It was estimated by Foreign Economic Administrator Leo T. Crowley, when he recently testified before the Senate Banking and Currency Committee, that Russian trade credits alone would come to around $1 billion. Making allowance for the needs of other countries, he estimated that the $2.8 increase in the bank's capital would be sufficient to take care of foreign trade credit needs only for a 12-month period at most. In other words, a vast amount of business is in sight.

The State Department is planning to go to work immediately to exercise some of the power given it in the Reciprocal Trade Agreements Act extension to reduce tariffs by up to 50 per cent of the rates existing on Jan. 1, 1945. The plan initially is to use this increased bargaining power to wipe out British Empire discriminations against the United States and thus get our exporters in a position to do business in large volume with Great Britain and Canada.



Recent congressional actions have fairly well cleared the decks for making postwar foreign trade arrangements

It is expected also that no time will be lost in arranging new trade treaties with France, the Netherlands, Belgium, Turkey, Sweden, Switzerland and most of the American republics.

Under the Bretton Woods agreement act, the State Department is prepared to arrange United States membership in the proposed International Monetary Fund and the International Bank for Reconstruction and Development.

But the process will take some time as the fund and the bank cannot be organized immediately.

In keeping with the general American desire to remove all possible barriers to the development of foreign trade, the War Production Board has ruled that machinery and other American goods urgently needed for the rehabilitation of the industries of Russia, Great Britain and other countries may have a rating in the new MM band recently assigned to cover urgent military requirements. Exporters and exporting manufacturers, as well as purchasing representatives of foreign governments or private interests abroad, may apply to the Foreign Economic Administration for MM ratings on specific orders.

British Steel Industry Launches Five-Year Modernization Program Costing $480 Million

FIVE-YEAR modernization program designed to increase steel ingot production capacity by 20 per cent, has been launched by the British iron and steel industry, it was announced in London last week by Sir John Doncanson, commercial and technical director, British Iron & Steel Federation. It is estimated the expansion will cost in excess of $480 million.

During the war the British industry produced and handled 86 million tons of steel, of which 14 million tons were imported. A 20 per cent increase is expected to raise potential British capacity to around 17 million tons.

Some of the work already has been started, but the entire project has not yet been approved by the government.

The overall program calls for rebuilding or replacing of nearly a third of the industry's 98 blast furnaces. Plans under study call for construction of new coke ovens at a cost of $26 million, 19 new blast furnaces costing $76 million, new melting shops costing $80 million; replacement and reconstruction of rolling mills, including installation of new continuous hot strip mills in South Wales at a cost of $132 million. and ancillary processes costing $70 million.

Work has been started on the building of four blast furnaces and the replacement of coke ovens in Scotland and on

the northeast coast. However, the overall steel plant modernization program, it is said, will move ahead slowly for some time. In the Midlands an expansion of open-hearth capacity is underway, which, when completed, will add 100,000 tons of ingot capacity yearly for the production of special tube steel.

The British steel industry is devoting especial attention to the housing program which has priority in Britain. New steel facilities for production of the most modern hot-rolled sections for window casements, and new mills for rolling light structural sections are planned. Steps also are underway looking toward the enlargement of capacity and complete mechanization of 28 foundries to meet the demand for castings for such items of home equipment as bathtubs and kitchen hardware. Construction of new sheet mills to provide sheets for the motor car industry is projected.

German Steel Capacity Cut To 10 Million Tons Seen

Reports received here last week from London were to the effect the Big Three, meeting in Berlin, would act favorably upon a proposal to reduce German steelmaking capacity from an estimated 27 million tons to 10 million tons of ingots annually.

According to the reports, the program worked out for Germany involves the dismantling of two out of every three steel furnaces and most of the rolling mills; also reducing the Hermann Goering works to only 25 per cent of its original size. The objective of those in charge of the German economic program, it is said, is to gear the country's steel production to the needs of an agricultural society.

"More Power to America" Plan Launched by GE

A long-range program calling for unified action by electric power companies, machinery manufacturers, and electrical manufacturers and designed to accelerate the mechanization and electrification of postwar industry and farming has been announced by General Electric Co., Schenectady, N. Y., through President C. E. Wilson.

Labeled the "More Power to America" plan, the program comprehends many months of research field investigation, analysis by GE research engineers, and co-operation by representatives of other industries. During the past several months the program has been presented informally to many interested groups.

Put into action widely, the program would facilitate the reconversion of industry on a soundly engineered basis, to insure costs that will enable businesses to compete successfully in the domestic and export markets.

Two Economists Appointed To Study Guaranteed Wage Problem

THE GUARANTEED wage study which the late President Roosevelt assigned to the War Mobilization and Reconversion Board has been placed in the hands of two experienced economists who believe it will take them anywhere from 6 to 18 months to reach any sound conclusions.

As announced by Eric Johnston, chairmain of the Guaranteed Wage Subcommittee of the board's advisory committee, the economists are Murray Latimer, chairman of the Railroad Retirement Board, and Arthur S. Meyer, formerly chairman of the New York state Board of Mediation and in recent years chairman of numerous labor board panels. Mr. Latimer, who formerly taught economics at Harvard, and who will continue as chairman of the Railroad Retirement Board, will organize a staff to approach the problem through research studies, Mr. Meyer will head a Conference Division to hold sessions with groups to examine all possibilities.

In undertaking the study, said Mr. Johnston, Messrs. Latimer and Meyer will concern themselves primarily with the problem of leveling off economic cycles so as to permit continuity of employment.

Mr. Johnston stressed the fact that no compulsory system of guaranteed wages is contemplated and pointed out that there is general agreement between industry, labor and other circles that continuity of employment is good for the economy.

He also stressed that the study is being approached in the belief that continuity of employment will require an expanding economy. There is no intention, he declared, to devise any scheme under which employees would be paid for work not done.

The issue, he told a press conference, first was raised in the steel wage case when the War Labor Board refused to rule on the issue due to lack of information, and suggested that the President appoint a special committee to study the problem. Since then the guaranteed wage has been asked in many wage cases.

Mr. Meyer said that a study of the guaranteed wage problem automatically will include a study of postwar wage rates.

In addition to the War Mobilization and Reconversion Board study which is being undertaken entirely for the government, Mr. Johnston said that the United States Chamber of Commerce, of which he is president, also is launching a separate study of its own on the guaranteed wage problem.

TRANSITION TOPICS

WESTERN STEEL— Markdown of $40 million in Fontana Steel loan expected. Terms for refinancing may be announced soon. See page 52.

AUTOMOBILES— New company, representing Graham-Paige and Kaiser interests, reveals plans to build two new postwar cars, one on West Coast and one in Detroit. See page 53.

RESEARCH— National policy to encourage scientific research gains favor in Congress. Several bills pending. Dr. Vannevar Bush outlines recommendations for National Research Foundation. See page 56.

RECONVERSION PRICING— Manufacturers provided method for obtaining individual adjustments. New OPA orders clear way for resumption in some types of civilian goods. See page 60.

MODEL PLANTS— Clayton & Lambert Mfg. Co.'s well planned layout of modern metalworking tools and handling equipment one day will be available for normal pursuits. Many new ideas incorporated in model plants like these may be studied with profit by management planning reconversion. See page 82.

DIE CASTING DESIGN— From now on designers of non-military products will become increasingly engrossed in selection of material and manufacturing process, essential factors in the overall design problem. Those who have chosen die casting as their production medium may find helpful the fundamental data compiled by technical staff of New Jersey Zinc Co. See page 104.

Creation of Scientific Research Agency Under Study by Congress

Permanent national foundation to place research contracts with and award grants to colleges, universities and research organizations gains favor. Several bills pending. Action probable after summer recess ends

CREATION of a national scientific research agency by congressional action before the end of the calendar year appears likely. Much preliminary work has been done, several bills are before Congress and a number of reports on the subject have been made.

The agency to be created probably will be empowered to place research contracts with and award grants to colleges, universities and research organizations and probably will be backed by a liberal appropriation.

Momentum to the movement for the creation of such an agency was gained this month through a report submitted to the White House by Dr. Vannevar Bush, director, Office of Scientific Research and Development, in which was recommended establishment of a National Research Foundation to encourage research in the following fields: Medical, natural sciences, national defense, scientific personnel and education, and publications and scientific collaboration.

Compromise Bill Expected

Among the bills now pending before Congress is the Kilgore bill of the 78th session which was reintroduced this session in revised form. It is aimed at meeting the country's scientific research needs for peacetime as well as military purposes. Other bills pending in the Senate are the Byrd, Magnuson and Fulbright bills, while in the House there is the May bill. Detailed study of these bills may be begun in September and certainly not later than October, with a view to writing a measure which will compromise existing differences of opinion.

Before final legislation can be drafted three sets of controversies will have to be resolved. One is between the Army and Navy. The second is between the "brass hats," as the Army and Navy are bracketed, and Congress in general. The third is between congressmen who now hold various opinions as to how the scientific research show should be conducted.

At present the Army favors the May bill and the Navy favors the Byrd bill. Prevailing sentiment among interested congressmen appears to be against the May bill for the reason that it would put the research program under the direction of the National Academy of Sciences, which organization is not accountable to Congress or to the President. Of the two bills, the Byrd bill appears to be more acceptable for the reason that it would create a new body, the Research Board for National Security, which would be accountable to Congress as well as to the President.

Both bills, in the opinion of many congressmen, are deficient because they are concerned chiefly with the scientific

DR. VANNEVAR BUSH

research work to promote our military security. These congressmen are heartily in favor of a continuing research program to insure military security but they want a law that will accomplish not only this objective but the equally important one, as they see it, of providing for research work that will be needed to bring about new activities and new products needed to permit realization of the current "full employment" goal in the postwar era.

The main quarrel between military leaders on the one hand and members of Congress on the other is due to the fear of the former that military scientific work will suffer if it is to be wrapped in the same package with research aimed at promoting our general economic activity and employment. They remember the difficulties they had in getting money to support their programs before this war and they want a law which will keep military scientific research independent of other research.

Still another angle is their fear that military scientific secrets might not be as well guarded by a civilian agency as by one whose members were appointed by and strictly accountable to the Army and Navy.

A feature of the May and Byrd bills which has been especially criticized of late is that they would put research work for national security under groups rather than under individuals. The situation which caused President Truman to urge a one-man instead of a three-man control over surplus property disposal has made a deep impression and many congressmen feel that the delegation of authority over our scientific research program should be vested in a single man. This view is shared by the Bureau of the Budget.

The various objections, as far as Congress is concerned, appear to be met quite effectively by the Fulbright bill, introduced in the Senate July 9. It would create a new agency, a Bureau of Scientific Research, but objections to giving birth to still another government agency are met in part by putting the new bureau into the existing Department of Commerce. The present National Inventors Council and the Office of Production Research and Development of the War Production Board would be transferred to the bureau with all their records. The bureau would be run by a single administrator who would be empowered to call on the National Bureau of Standards. One of his principal duties would be to find ways and means of benefiting private industry and the public through utilization of inventions and discoveries resulting from federally financed research work.

Kilgore and Fulbright Bills

The Fulbright bill, however, does not define the government's responsibility over scientific research work in the nation in general, and it does not provide any appropriation for such work. Although it is incomplete, therefore, it apparently would provide a good working arrangement within the scope of a larger measure such as the revised Kilgore bill.

The Kilgore bill would place scientific research under a National Science Foundation headed by a single director who could not pass the buck when called on for a report either by Congress or the President. Developed after long study by the War Mobilization Subcommittee of the Senate Military Affairs Committee, it aims to provide for all scientific research needs, including those of the general public in times of peace, as well as those of military security. The purposes, as reported to the Senate when the bill was placed in the hopper, are to:

"1—Provide for an increase, above the prewar level, in the government's support of research and development of activities in fields that are predominantly in the public interests, notably

national defense, health and medical care, and the basic sciences.

"2—Provide for an efficient formulation and co-ordination of all federally supported research and development work, utilizing as far as possible the existing resources of public and private research organizations, particularly nonprofit educational institutions and research foundations.

"3—Stimulate a general expansion in research and development by private organizations and institutions.

"4—Promote a wide flow of scientific and technical information to industry and agriculture and business, particularly small enterprises.

"5—Encourage the rapid introduction and full use of scientific discoveries and the most advanced techniques and inventions.

"The foundation," said the report, "should not itself, as a general rule, perform any research or development work. Instead, it should make funds for this purpose available to other organizations, public or private, who are already staffed or equipped to do so."

While the bill gives the director power to spend appropriated funds on such research work as his own judgment approves, it gives him such leeway only on 40 per cent of his appropriation. It is stipulated that three categories receive 60 per cent of the total; national defense, national health and advancement of the basic sciences each would get 20 per cent.

Crucial Point Reached

The report recites what scientific research work contributed to the winning of the war and declares: "We cannot afford to slacken our efforts in the fight for peacetime prosperity and permanent security . . . Because science is decisive, both in war and peace, we must provide for it systematically within the regular framework of the government. We stand at a crucial point in the promotion of science in the United States."

Basic research, the foundation of all applied science, the report said, has been done in this country largely through private philanthropy. "But private funds have not been adequate, and there is little prospect that they will increase in the future. Furthermore, they have covered only a scattered selection of fields. We have depended in the past very heavily on the basic research done in Germany with the support of the German government. It is quite clear that we can no longer rely upon Germany for basic or applied research. Hereafter we must rely on ourselves."

No attempt is made in the Kilgore bill to suggest the amount of appropriation needed to implement the program. The committee report made it clear the estimate of funds needed can be made only after the scope of the work has been decided.

The report of Dr. Bush of the OSRD is being studied carefully by interested members of Congress and in general its recommendations are regarded highly.

Dr. Bush would have Congress create a National Foundation authorized to place contracts for scientific research work, grants to cover scholarships and fellowships, and in general to develop and promote a national policy for scientific research and scientific education,

CASPER W. OOMS

Newly sworn in as commissioner of patents, Mr. Ooms is shown after taking the oath of office. He succeeds Conway P. Coe, who resigned.

"to support basic research in nonprofit organizations, develop scientific talent in American youth and support long-range research on military matters."

Dr. Bush runs counter to some strong congressional views as to the government's interest in patents that would result from government-financed research. "To protect the public interest," he says, "the government would receive a royalty-free license for governmental purposes under any patents resulting from work financed by the foundation. "But," he says, "there should be no obligation on the research institution to patent discoveries made as a result of support from the foundation. There should certainly not be any absolute requirements that all rights in such discoveries be assigned to the government, but it should be left to the discretion of the director and the interested division whether in special cases the public interest requires such assignment."

The director, Dr. Bush advises, should be chosen by nine members "selected by the President on the basis of their interest in and capacity to promote the purposes of the foundation, and not otherwise connected with the government, and not representative of any special interest." This concept is counter to what seems to be the prevailing thought in Congress, that there should be one-man control.

The foundation, Dr. Bush goes on, would have five divisions to specialize on medical research, natural sciences, national defense, education of scientific personnel and research, and publications and scientific collaboration. This view, of including military scientific research along with all other scientific research, as indicated above, goes counter to the often repeated recommendations of Army and Navy spokesmen.

Dr. Bush might also encounter some objections in other directions. For instance, the foundation, he says, should be authorized to "make, amend or modify contracts of all kinds with or without legal considerations and without performance bonds." Advance payments, he says, should be allowed in the director's discretion and "finally, the normal vouchering requirements of the General Accounting Office with respect to detailed itemization or substantiation of vouchers submitted under cost contracts should be relaxed for research contractors."

To make it possible to obtain the services of men of great competence and experience, the foundation should be able to engage men without preventing them from simultaneously engaging in private and gainful employment "with the exception that no compensation for such employment is received from any profit-making institution which receives funds from the foundation or the division of the foundation with which the individual is concerned."

In general, says Dr. Bush, the research sponsored by the National Foundation "should be conducted on an actual cost basis, without profit to the institution receiving the research contract or grant."

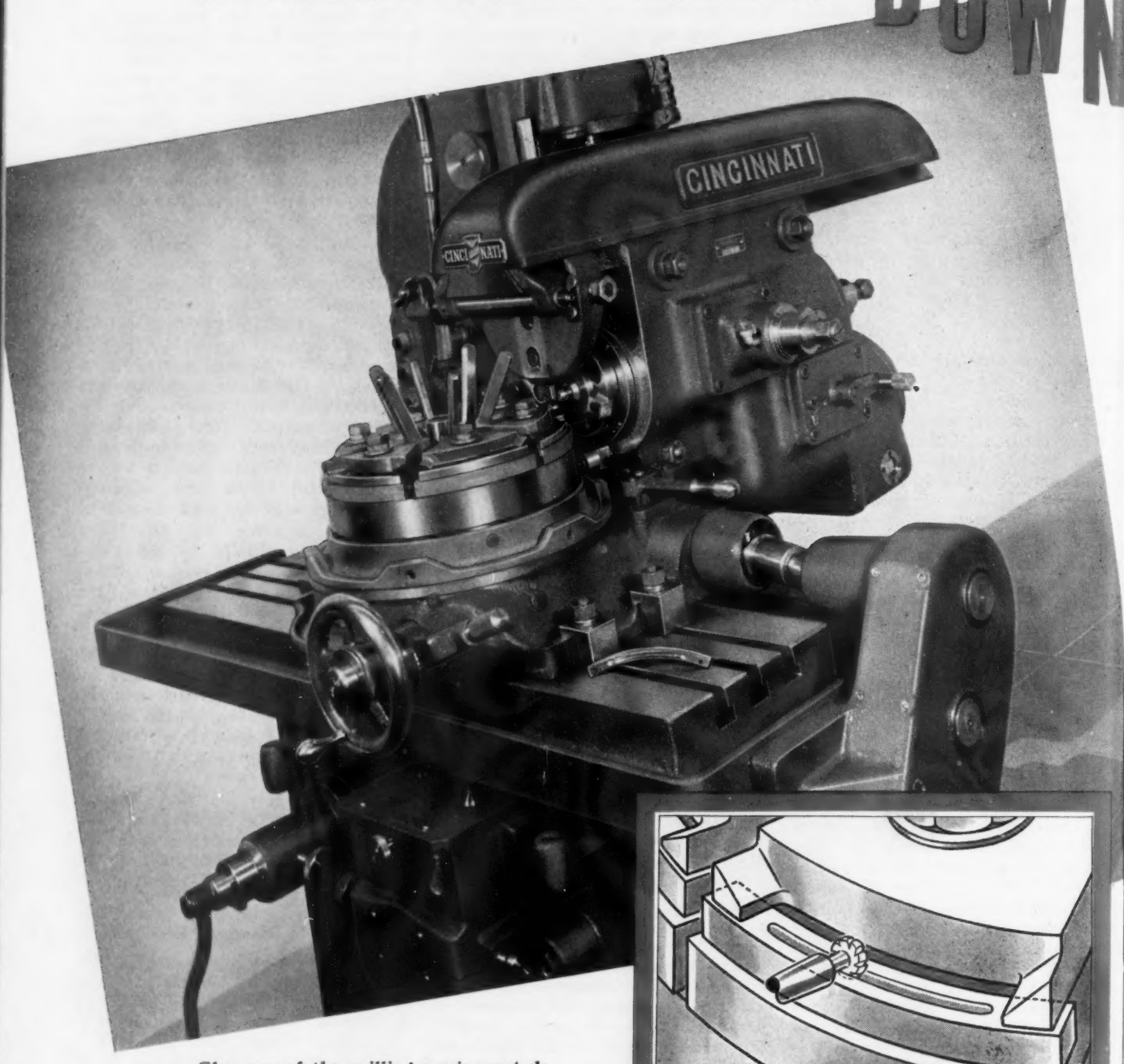
Research Incentives Required

The government, recommends Dr. Bush, should provide suitable incentives to industry to conduct research "(a) by clarification of present uncertainties in the internal revenue code in regard to the deductibility of research and development expenditures as current charges against net income, and (b) by strengthening the patent system so as to eliminate uncertainties which now bear heavily on small industries."

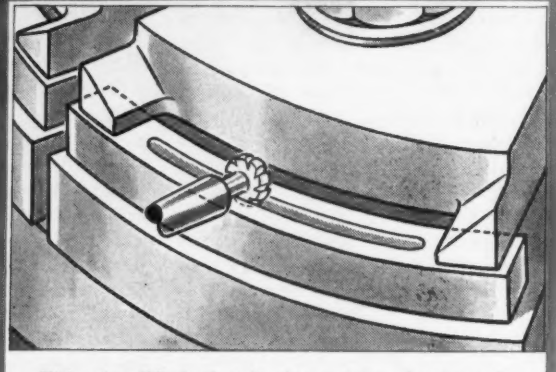
Dr. Bush estimates roughly that the foundation should be permitted to spend around $33 million in the first year, going up gradually to around $122 million in the fifth year and thereafter at the latter figure annually.

Since World War I, he said, millions of people have found employment in industries that did not then exist—radio, air conditioning, rayon and synthetic fibers, and plastics. "These things do not mark the end of progress—they are but the beginning if we make full use of our scientific resources."

AUTOMATICALLY MILLING DOWN A



Close-up of the milling equipment described on the opposite page. Rods protruding from the fixture are handles of cam clamps which hold the parts in position for milling. The machine is a CINCINNATI *No. 2-24 Automatic Cam Controlled Rise and Fall Miller.*



This simplified sketch shows how the part is milled. The cam mounted on the circular milling attachment, and the roller affixed to the spindle carrier, synchronize the rise and fall of the cutter with the rotation of the attachment.

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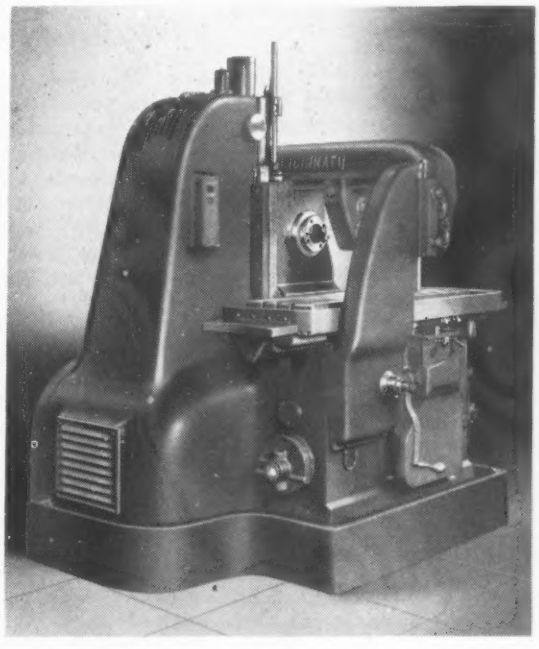
THEN UP INTO THE CLEAR FOR THE NEXT PART

CINCINNATI

The combination of a CINCINNATI No. 2-24 Automatic Cam Controlled Rise and Fall Miller, with a Cincinnati engineered Power Feed Circular Milling Attachment and Fixture, make easy work of a tricky milling job. The operation consists of milling grooves in top and bottom of piston ring segments. All movements of the machine and attachment are synchronized, and the entire procedure is automatic and continuous. ¶ The fixture, mounted on the circular milling attachment, has six stations, and as milling progresses on one part, the operator unloads and loads each station as it comes around to his working position. This is accomplished by simply releasing and tightening the cam clamps, handles of which protrude above the fixture as shown in the illustration. There is no interruption in production. ¶ The entire setup was developed by our Application Engineers. They will be glad to talk to you about more practical and economical ways of handling your difficult milling operations.



CINCINNATI No. 2-24 Automatic Rise and Fall Miller. Catalog M-909-1, containing complete information and specifications, will be sent on request. For a brief description of this machine, look in Sweet's Catalog File for Mechanical Industries.

MILLING MACHINE CO. CINCINNATI 9, OHIO, U. S. A.

BROACHING MACHINES • CUTTER SHARPENING MACHINES

Manufacturers Provided Method for Obtaining Individual Adjustments

OPA issues three new orders, clearing way for production of many types of civilian goods. They provide prompt action on pricing applications of large firms and permit small firms to start selling 15 days after they have filed their prices

THREE pricing orders clearing the way for manufacturers reconverting to production of many types of civilian goods have been announced by the Office of Price Administration. These orders carry out one part of the reconversion pricing program announced May 11.

The basic part of this program provides for industry-wide review of existing ceiling prices of reconversion products, most of which were set in 1942; the other major part provides methods by which individual reconverting firms can get individual price adjustments rapidly.

The orders permit small firms to start selling 15 days after they have filed their prices with OPA and provide larger firms with machinery for prompt action on their applications for approval of prices of civilian goods which may be made as rapidly as materials and manpower can be freed from war production.

"OPA's program is very flexible," OPA Deputy Administrator Brownlee said. "Every manufacturer now has a ceiling price—usually set in 1942—at which he can begin production immediately without consulting OPA. But where certain costs have gone up to such an extent that to maintain ceiling prices would delay production, OPA is ready to take immediate steps to remove the price impediment. We are providing quick and practical methods for making necessary individual ceiling price adjustments.

"We are confident that our program . . . . provides the basis for good profits when production gets rolling. At the same time, this program maintains our guard against the inflation of prices and operating costs which ultimately led to the destruction of so many businesses and jobs after the last war and delayed successful reconversion for two years."

All applications for individual price adjustments will be filed in OPA district offices. Authority to make decisions in most cases has been delegated to regional offices and to many district offices located in key manufacturing areas. Industry-wide price reviews and individual adjustment cases for some large firms will be handled by the national office in Washington.

Industry-Wide Pricing: Review of existing prices on the basic industry-wide formula is nearing completion for several industries and the results will be announced shortly. This industry-wide pricing provides a reconversion industry with a price increase factor, which may be applied to prices that were in effect during its last period of normal production, usually 1941.

These increase factors will be calculated by adjusting the 1941 costs of an industry for any subsequent legal increases in basic wage rate schedules of factory workers and for legal increases in the prices of materials and parts. To these adjusted 1941 costs will be added a margin equivalent to the same percentage profit on sales which the industry enjoyed in a representative peacetime period, usually the 1936-39 average. Each reconverting firm may increase its own 1941 prices by the industry-wide price increase factor.

Individual Adjustments: Methods for making necessary adjustments in the prices of reconverting manufacturers who find themselves in one of the following situations are provided in the new orders:

1—Reconverting manufacturers in industries that as a whole never converted to war work and that will have no industry-wide applications of the reconversion pricing formula. 2—Reconverting manufacturers who need temporary prices while awaiting announcement of industry-wide price increase factors. 3—Reconverting manufacturers who need adjustments for hardship because they cannot operate at their existing ceilings or under the industry-wide price increase factors.

Reconverting Manufacturer: A firm is a reconverting manufacturer if it meets the following tests: 1—It produced one or more of the following products: Portable air conditioners, aluminum ware, bicycles, carpet sweepers, metal caskets, certain clocks, certain small electrical appliances, certain home and office furniture and fixtures, golf bags and clubs, certain lawnmowers, coin-operated machines, office machines, certain store machines, innerspring mattresses, metal musical instruments, playground and gymnasium equipment, certain radios, phonographs and radio-phonograph combinations, electric ranges (except domestic), domestic mechanical refrigerators, safes and vaults, sewing machines (except industrial), household health scales, silverplated flatware, roller and ice skates, metal and rubber toys, vacuum cleaners (except industrial), domestic washing machines, ironers and driers.

2—Or its maximum price is fixed by one of the following regulations: No. 188 (Manufacturers' Maximum Prices for Specified Consumers' Goods Other Than Apparel), No. 64 (Domestic Cooking and Heating Appliances), No. 86 (Domestic Washing Machines), No. 102 (New Household Mechanical Refrigerators), No. 111 (New Household Vacuum Cleaners and Attachments), and No. 254 (New Small Firearms and Firearm Parts).

3—For any product covered by paragraph 2, its 1944 volume of civilian plus war sales of the product (or of the product line to which it belongs) was less than half what it was in 1941; and the curtailment in the firm's production was due to the needs of the war effort, and it now can resume volume manufacture of the product in question.

Other regulations and products will be added later by OPA.

Amount of Adjustments: Individual adjustment provisions for reconverting manufacturers differ according to size of the company in order to reflect differences in the character of their accounting records and differences in their relative ability to absorb abnormal costs of the starting-up period.

The three new orders divide manufacturers into these three classes: (1) Those with annual sales (excluding war contracts) of more than $200,000; (2) those with sales between $50,000 and $200,000; and (3) those with total sales of less than $50,000.

1—A reconverting manufacturer with civilian sales of more than $200,000 annually may receive an adjustment if he shows that his ceiling price for a product does not cover his 1941 total cost for the product, plus an adjustment to reflect subsequent legal increases in materials prices and in his basic wage rate schedules of factory workers. Where that is the case, he may add to his 1941 cost, adjusted as just described, an industry profit factor specified by OPA. This profit factor will equal one-half of the average percentage margin of profit over total cost

RECONVERSION SUPPLIES

War Production Board approved from July 7 through July 12, 109 new applications for construction and equipment materials necessary for industrial reconversion. These called for expenditure of about $5,581,000. Approvals from April 1 through July 12 came to 1388 applications, amounting to $249,262,000.

At the close of business July 12, automobile and equipment industry had 287 approved applications for $141,740,000; iron and steel and products industry, 337 approved applications for $50,186,000.

for the industry or industry group in the peacetime period of 1936-39. Firms in this group must file adjustment application forms with their OPA district offices and must receive notice of adjustment from OPA before they can sell at prices above their present ceilings.

2—A reconverting manufacturer with annual sales (excluding war contracts) between $50,000 and $200,000 may calculate a new ceiling price on a simpler form, mail it to the nearest district office of OPA and proceed to sell at this price after 15 days unless he is notified to the contrary. The manufacturer in this class will add to his 1941 cost, increases in materials prices and increases in his straight-time factory labor rates. To his 1941 cost so adjusted he may add a profit factor equal to his own 1936-39 profit margin or one-half the industry average profit in 1936-39, whichever is higher.

3—A reconverting manufacturer with annual sales of less than $50,000 will calculate his present costs and he then may add either his own profit margin of the first of the years 1939, 1940, and 1941 for which he has profit data, or one-half the industry average profit margin of 1936-39. The manufacturer may proceed to sell at this price 15 days after mailing it to the OPA district office unless he is notified to the contrary.

New Manufacturers: The new orders apply only to old manufacturers already in business who are reconverting to production of consumer durable goods which they previously made. Another order is in preparation which will provide a simplified precedure to be used by small new manufacturers in this field.

These orders, effective as of July 23, are entitled: Supplementary Order No. 118 (Small Volume Manufacturers Reconversion Pricing), Supplementary Order No. 119 (Individual Adjustments for Reconverting Manufacturers), and Reconversion General Order No. 1 (Simplified Pricing Method for Reconverting Manufacturers Having Sales Less Than $50,000 Per Year).

Appointments-Resignations

Carroll R. Daugherty, wage stabilization director, and Leonard L. Berliner, disputes director, have resigned these positions in the National War Labor Board. Mr. Daugherty has been named director of Lend-Lease in Washington while Mr. Berliner is returning to private law practice in New York. The Disputes Division will be headed by W. Willard Wirtz, who also will remain as general counsel and director of the Legal Division of the board. The Case Analysis Division will be headed by Herbert Unterberger. The Program Appraisal and Research Division will be headed by Harry M. Douty who has been chief of the Program Appraisal Branch Wage Stabilization Division.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

LOCOMOTIVES AND CARS: Orders L-97 and L-97-a, which controlled production of new locomotives and new railroad type cars, respectively, have been revoked. (L-97, 97-a)

LUGGAGE: Order L-284, which controlled manufacture of trunks, traveling and overnight bags and scores of luggage items, has been revoked. (L-284)

NICKEL: Order M-6-b and direction 1 to that order, which controlled the end uses of nickel and nickel solutions, respectively, have been revoked. Order M-6-a, which controls allocation of nickel, remains in effect. (M-6-b)

AMENDMENTS

STAINLESS STEEL: Stainless steel is now available for unrated orders to the extent that alloys and mill capacity is available after filling CMP orders. This was effected by revocation of direction 2 to order M-21; through amendment of CMP regulation No. 4; revocation of directions 62 and 66 of CMP regulation No. 1. (M-21, CMP Nos. 1 and 4)

BRASS MILL PRODUCTS: WPB has revoked the requirement that each brass mill report any open capacity for producing brass strip, rod and tube in writing to WPB; also, the requirement that within 48 hours of receipt of notice from Army or Navy contractors canceling items previously directed on forms CMPL 259 A, B, and C, a brass mill must inform Copper Division by letter, in duplicate, stating the CMPL directive number and the type and amount of material canceled. (CMP No. 1)

FC ALLOTMENTS: An order placed against previously granted allotments (for further conversion of steel from one form to another) and accepted for third-quarter delivery shall be considered as bearing allotment symbol FC-1. A producer may use this symbol to replace steel of the same product group (listed in schedule 1 of CMP regulation 1) that was used as conversion material to fill authorized controlled material orders.

An order placed against the previously granted allotment and accepted for delivery after Sept. 30, 1945 (but not beyond December, 1945), must be maintained in the producer's CMP order acceptance up to 45 days prior to first of the month for which delivery is specified. It must then be canceled unless it has been revalidated with an FC-1 or FCZ symbol.

When a production directive on a product is canceled, an order placed against the FC-1 allocation under the directive and accepted for delivery in the first and second months succeeding the cancellation of the production directive is still treated as bearing the symbol FC-1.

A space reservation established by an FC-1 allocation for the third and later months (not beyond December) succeeding the cancellation of the production directive must be maintained in the producer's CMP orders acceptance up to 45 days prior to first of the month for which delivery is specified. At that time, space reservation will be canceled unless the order has been revaliated as a new FC-1 order under the direction. (CMP No. 1)

CANS: Black plate is chargeable to a packer's canning quota if it is used in combination with tin plate or terne plate in making the cans the packer uses. It is not chargeable to the quota if the cans are made wholly from black plate or if the black plate is used in combination with some other material. (M-81)

SCHEDULED PRODUCTS: Steam locomotives, diesel electric locomotives of 600 hp and over, freight cars over ten tons capacity and passenger cars have been listed in table 18 of order M-293 as undesignated products.

Scheduling of orders for valves and pipe fittings intended for installation in the naval destroyer-escort construction program is no longer required. (M-293)

PRIORITY REGULATIONS

PREFERENCE RATINGS: Veterans Administration has been placed on an equal basis with the military in the matter of preference ratings. It is permitted to assign preference ratings, including the MM (military) rating, to all of its procurement, including materials for maintenance, repair and operating supplies for its establishments.

Rules to be followed by manufacturers who received priorities assistance or an authorization for machine tools or other facilities for a military contract that has been canceled or cut back are outlined in direction 9 to Priorities Regulation 1. It applies to ratings or authorizations given on form WPB-542, GA-1456 or any other rating or authorization form. It provides for procedures to be followed by a manufacturer after cancellation of a military contract for which he had been authorized to purchase machine tools or building service equipment. Procedures are established for machine tools or equipment orders that have not been placed, and also where the orders already have been placed. (No. 1)

PRICE REGULATIONS

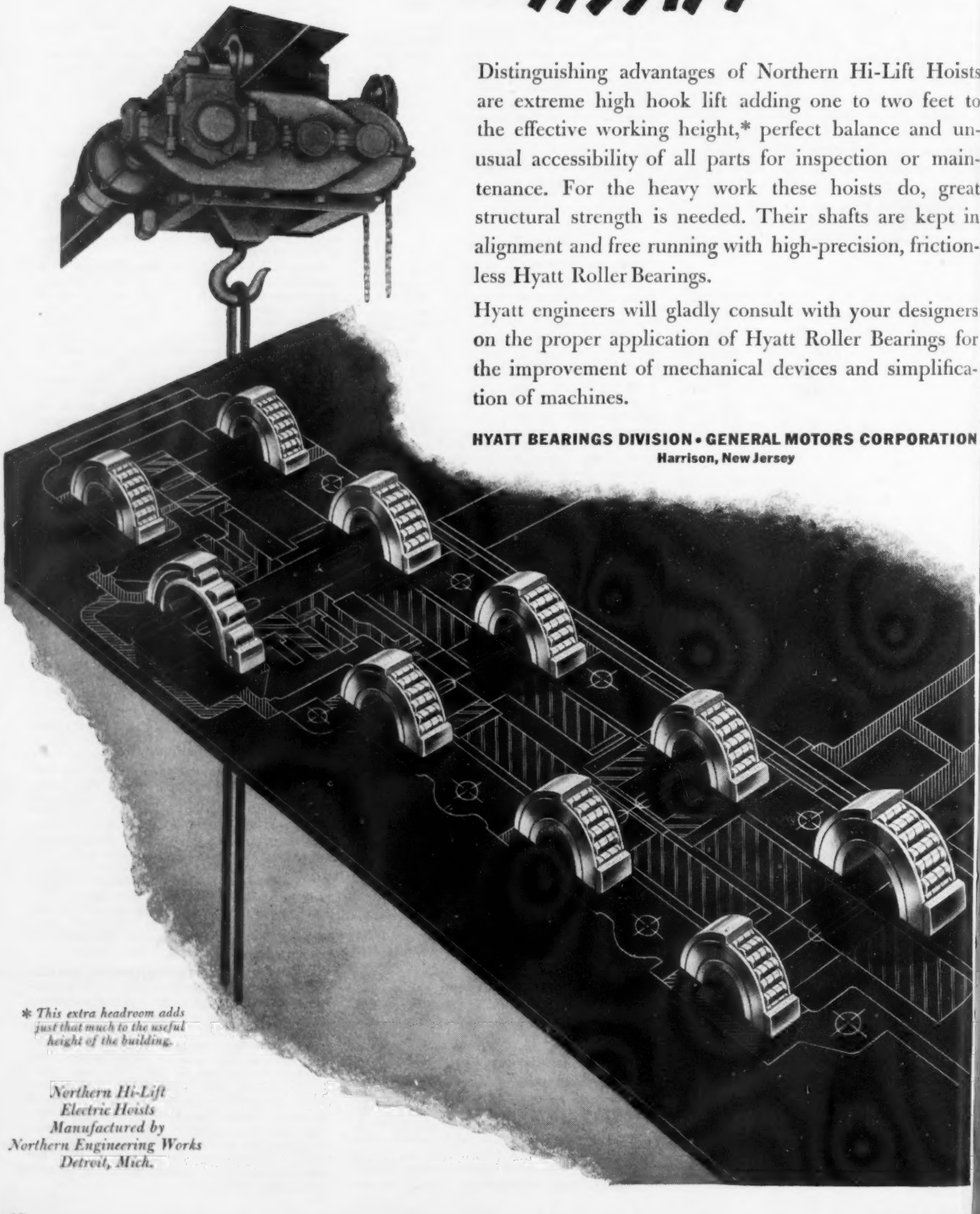
INNERSPRING MATTRESSES: Manufacturers who shipped 5000 or more innerspring mattresses between July 1, 1940, and June 30, 1941, and all manufacturers who ship 400 or more of these units during any month beginning with July, 1945, must notify OPA by the fifteenth of each month of the size and value of shipments in each of five listed price groups during the preceding month. Established manufacturers must also report the size and value of shipments in each of the price groups during the year ending June 30, 1941, for purpose of comparison. (No. 188)

SPECIFIED MECHANICAL BUILDING EQUIPMENT: Hundreds of equipment items, including builders' hardware, screening, cast and sheet metal building materials, heating and air conditioning equipment, control equipment, valves and pipe fittings, pipe accessories, mechanically operated refrigeration other than domestic mechanical refrigerators, plumbing equipment, etc., are now priced under a new regulation, No. 591. Base ceiling prices are the same as existed under price regulations Nos. 136 or 188. The new regulation provides three methods of pricing a new mechanical-building-equipment commodity offered for sale by a manufacturer for the first time after July 30. Provisions governing adjustment of ceiling prices are revised. (No. 591)

SPECIFIED CONSTRUCTION MATERIALS AND REFRACTORIES: A new price regulation, No. 592, covers many building materials, including: Bituminous-coated steel sheets, clay products, metal lath and accessories, pipe and boiler installations, refractories, etc. Base ceiling prices are the same as existed under price regulations Nos. 136 or 188. The new regulation provides four methods for establishing prices for new construction items first offered for sale by the manufacturer after July 30. The provisions governing adjustments of ceiling prices are revised. Forms are set forth for use by manufacturers in applying to OPA for establishment of a ceiling price for a new commodity. (No. 592)

High Grade Heavy Duty Hoists for heavy duty service...

BEARINGS: HYATT



Distinguishing advantages of Northern Hi-Lift Hoists are extreme high hook lift adding one to two feet to the effective working height,* perfect balance and unusual accessibility of all parts for inspection or maintenance. For the heavy work these hoists do, great structural strength is needed. Their shafts are kept in alignment and free running with high-precision, frictionless Hyatt Roller Bearings.

Hyatt engineers will gladly consult with your designers on the proper application of Hyatt Roller Bearings for the improvement of mechanical devices and simplification of machines.

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION
Harrison, New Jersey

* *This extra headroom adds just that much to the useful height of the building.*

Northern Hi-Lift Electric Hoists Manufactured by Northern Engineering Works Detroit, Mich.

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Oldsmobile 1946 models unveiled. Show numerous refinements but no radical changes. Congestion in flat-rolled steel puzzles mill representatives, unable to understand why books should be filled for months ahead on rated orders

AFTER giving the double-O to a couple of hand-built models of the 1946 Oldsmobile under the klieg lights at a GM photographic studio, correspondents pressed around S. E. Skinner, general manager of the division, to get his slants on how many, how soon and how much.

As to how many, he said Olds would follow the historical pattern of its proportion of total GM production in the initial restricted production period, about 13 per cent or roughly 12,500 cars over the remainder of this year.

As to how much, he had nothing to say, but there were whispers around the lobby of the General Motors building where five of the Olds models were on display last week to the effect the base price might be something like $1800.

As to how soon, Mr. Skinner said this was entirely a matter of how soon sufficient quantities of sheet and strip steel could be obtained, both by Fisher Body and by Olds itself. He was hopeful a start could be made by early fall."

The picture on sheet and strip steel is highly confused. One large buyer—not Fisher Body, Ford or Chrysler, incidentally—recently called in a dozen steel suppliers and asked for definite promises on delivery of a modest sheet tonnage. Only one could make a specific promise—Sept. 15—the rest saying they would be glad to take an order, but it would have to be placed "on the stack."

Apportions Available Supplies

The reason this one mill could make a commitment was that it had just received notification from plant headquarters that a small tonnage of unrated sheet business could be scheduled by mid-September. So the sales office here quietly notified half a dozen of its best automotive accounts, arbitrarily apportioning the available tonnage among them. Surprisingly enough, some of those contacted said they would be glad to take the tonnage but were forced to refuse because of the danger its acceptance would put them over the 45-day limit on inventories.

WPB field men, it appears, have been making a rather detailed check, starting with the Toledo area, on steel inventories and the word was passed rapidly to Detroit that they were cracking down on buyers whose stocks were over the new 45-day limit. This restriction applies to both rated and nonrated business, not war production requirements alone.

When a dispassionate attempt is made to analyze the flat-rolled steel situation from the standpoint of mill capacity versus present military requirements, the average mill representative just throws up his hands and says it is beyond him why all rolling capacity for sheet and strip should be booked solid on rated business for months ahead. He may add that he is planning to forget the whole mess and take a vacation for several weeks, hoping by this time the outlook will have clarified to the point where he can tell his customers just when they can expect tonnage on unrated orders.

Practically all business now being placed is unrated, and there is not too much pressure from these buyers for detailed information on date of shipment. Like the mills they are resigned to sit back and wait for the congestion to dissolve, believing that it may be only a matter of a few weeks and in the meantime there are other pressing problems on materials supply demanding as early a solution as the steel muddle.

Congestion does not apply only to flat-rolled steel, one mill office here reporting, for example, it has not been able to supply a single pound of carbon steel bars as yet on unrated orders. The entire carbon steel outlook is enveloped in gloom, although many suspect it may have some artificial aspects.

Radical changes in the 1946 Oldsmobile are missing, confirming advance reports. Refinements stressed by division spokesmen include: Radiator grille, made up of five separate zinc die castings—four horizontal bars and a base—spaced far enough apart to permit easy cleaning.

Front bumper, called a "wrap-around" type, sweeps back part way over the front fenders, protecting the forward corners of the car, and carries a deep, illuminated recess at the center for the license plate. Parking lights, with lucite lenses, are set into the two massive bumper guards. Special recesses are provided in the bumper to fit a jack, facilitating quick emergency wheel changes. Rear bumper is of the same wrap-around type to protect the fenders and also carries illuminated license plate in a center recess. Bodies are rustproofed inside and out, while steel stock used in the rocker panels and at the rear wheelhouse rail is 33 per cent thicker than formerly because of critical rusting encountered at these points. Rear fenders are new, being recessed to carry the bumper extension. Instrument grille is a one-piece die casting to minimize rattles. Some controls have been relocated for better accessibility. Hydramatic drive, the automatic transmission featured for several years by Olds, is continued but is not standard equipment. Expectations are that 90 per cent of all buyers will specify it. Numerous design refinements have been made in the light of experience gained through use of the unit in combat tanks. In the engine, pistons have reverted to aluminum and connecting rods have been lightened. Main and connecting rod bearings are of the durex sintered copper-nickel powder type.

On the heels of the Olds announce-

NEW OLDS: Front end view of the 1946 Oldsmobile showing die-cast grille of new design and massive wrap-around bumper which protects fenders as well as grille

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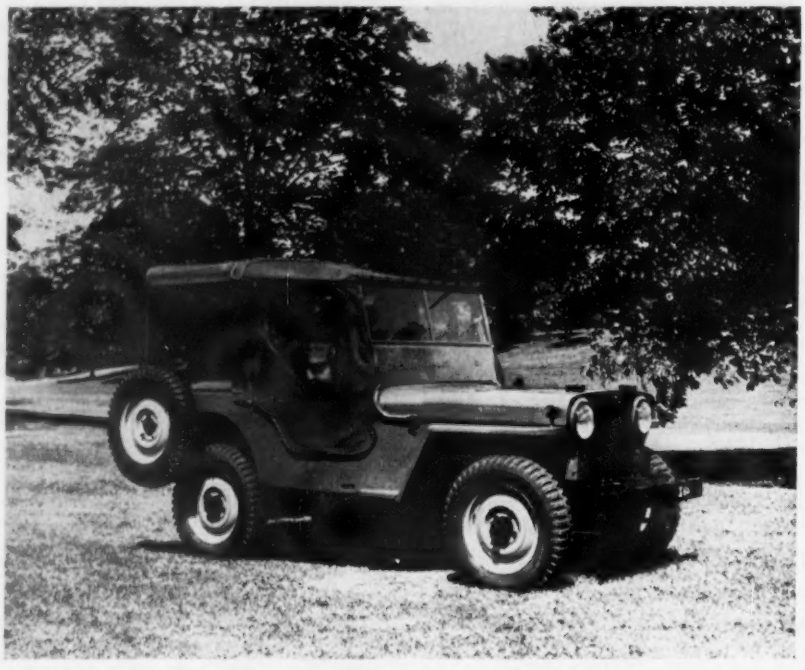


CIVILIAN JEEP: Combining the four basic functions of the tractor, light truck, mobile power unit and passenger conveyance, the postwar jeep is subject of an extensive promotion by the Willys-Overland Motors. The civilian model, recently unveiled, is equipped with removable top, front and rear. Willys is stressing its applications to farm tasks such as plowing, disking, mowing, raking, threshing, baling, sawing wood and similar jobs

ment came details of a multi-million dollar plant expansion now underway at the Buick Division in Flint, Mich., aimed at boosting this producer's capacity to 550,000 cars annually (Olds is looking toward a peak of about 450,000). Buick's hand-built 1946 models have been completed but are not being shown for the present, the division's officials feeling that their "big story" now is the plan being developed for more jobs in manufacturing departments, now seen in the neighborhood of 22,000 at postwar peak, or 40 per cent beyond prewar.

Principal units in the plant expansion program are a new sheet metal plant and car assembly building, replacing old buildings erected 40 years ago in the days of the Weston-Mott enterprises and adding over 1,300,000 square feet of floor space. Extensions will be made to engineering and experimental buildings, along with other minor modifications of the plant property to handle the increased capacity.

Further details of the General Motors Technical Center, mentioned briefly here last week, were provided at a New York luncheon given by Alfred P. Sloan Jr., GM chairman, before a group of scientists, engineers, educators and editors. Covering some 350 acres, the center is one of the most unusual and advanced architectural conceptions ever made, combining beauty and functionalism (see photo, page 76). Central element of the layout is a seven-acre lake, the excavation for which will provide fill for a surrounding terrace on which the various buildings will be erected, permitting ground level driveins. Lake will provide beauty to the setting, as well as serving to cool water required in the buildings.

Administration building will have a frontage of about 1000 feet along the west side of the 1/2 x 1/12-mile site. Main entrance driveway will pass beneath this building and lead to a two-lane highway around the central lake. To the south, facing north across the lake, will be the building of the styling section, 250 x 850 feet, main floor of which will house individual 50 x 70 foot design studios.

At the north end will be the research laboratories, largest of the buildings in the group. Adjacent to it will be a process development building, and on the east side of the lake will be a two-story advanced engineering building with 680 foot frontage. Ground floors of all buildings will provide under-cover parking for employees' cars.

Estimated cost of the project is in excess of $20 million, and ample room for expansion from the initial concept is available. It is emphasized by C. E. Wilson, GM president, the new technical center will not in any way change the corporation's concept of individual responsibility for each division's own product engineering, and activities being moved to the center will have no direct product responsibility. The new facilities will be purely a technical fact-finding and experimental development source, however, by a close liaison between the center and the manufacturing divisions, officials of the latter who have responsibility for production development and processing can make decisions affecting their activities with greater assurance and less loss of time. Work of the center will be supplemented by presently operated facilities such as the proving grounds at Milford, Mich., Phoenix, Ariz., and Miami, Fla., as well as the General Motors Institute at Flint, Mich. It will likely not be ready for occupancy inside of 18 months.

Consensus of farmers' opinion voiced privately at the showing of the Willys-Overland peacetime jeep at New Hudson, Mich., ten days ago, was that it might make a good second or third vehicle on the farm, but they still wanted a good tractor for No. 1. The jeep, in its tan and orange civilian clothes, is virtually a counterpart of the military version, except for arrangement of top, mounting of spare tire and transmission gear ratios. It is in production at a rate of something like 60 per day, and the Willys officials hope to build 20,000 of them before the year is out. They report for the present all Willys passenger car production plans will be based around the jeep-type vehicle.

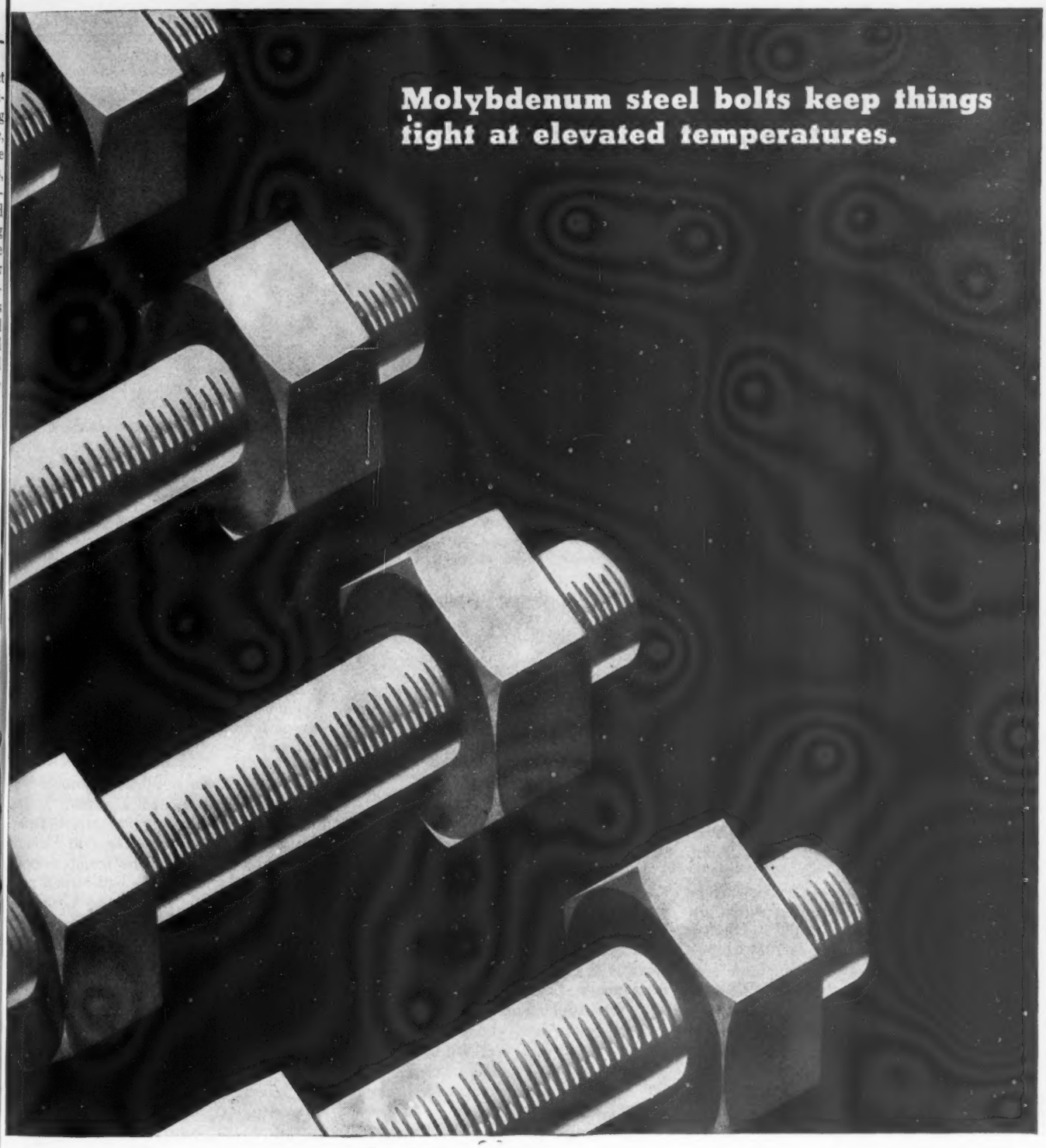
Price Range Unannounced

The big "if" in the jeep seems to be price and while no official figure has been announced reliable estimates are in the $1000-$1100 range, for the basic unit, without top or any extra equipment such as power takeoff or other accessories. This strikes many observers as rather high, but after all you cannot build a complicated transmission, with high and low speed ranges, disengageable front wheel drive, transfer case, etc., for peanuts. This unit, with the engine, constitutes the bulk of the cost of the jeep, for the body and suspension system are simple units, easy to make and assemble.

With accessory equipment, there are literally scores of farm uses for the jeep, many of which a tractor cannot handle. However, it definitely is not a "passenger car" and its economy in some stationary and slow-speed power tasks may yet have to be proved.

One interesting angle of the jeep is its terrific appeal to youngsters, suggesting to some farmers it might be the means of keeping small fry interested in farming and of teaching them farm tasks at an earlier age than has been possible in the past.

Large export market is envisaged for the jeep, over 600,000 military copies of which have been "published," and arrangements are now being concluded by Willys for sales in foreign countries. Certain industrial uses are readily apparent, but these are not being stressed as yet, other than the possible use of the vehicle by telephone line crews.



CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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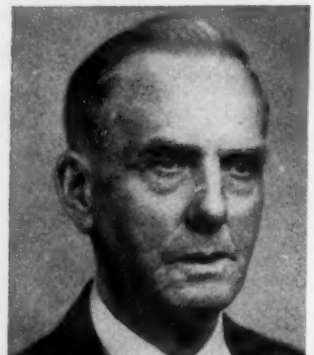
ROBERT R. TANNER



GEORGE W. MUNSON

W. L. O'BRIEN

Robert R. Tanner is president of the recently organized Tanner Chemical Co., Ferndale, Mich., with laboratories in Berkley, Mich. Mr. Tanner formerly was director of research for Parker Rustproof Co., Detroit, from which position he resigned last December.

—o—

Richard Righter has been appointed manager, sales personnel and training, Carnegie-Illinois Steel Corp., Pittsburgh. First employed by U. S. Steel subsidiaries in 1914, Mr. Righter a year ago became acting manager of the division which he now heads. **Dan A. Farrell** has been named supervisor of safety, and will make his headquarters in Pittsburgh. **Robert M. Jones** has been appointed foundry superintendent in the South Chicago plant succeeding Mr. Farrell. Mr. Farrell is a graduate of the University of Illinois, and he started with Carnegie-Illinois as an industrial engineer in the South Chicago mill in 1937. Later he became plant industrial engineer and was promoted to foundry superintendent in 1940. Mr. Jones was employed in the plant's maintenace division prior to being made assistant foundry superintendent in 1940.

—o—

W. Howard Williams has been elected president, Clark Controller Co., Cleveland, of which he was one of the founders. Mr. Williams served for several years as a vice president in charge of sales, and the past year was executive vice president and general manager.

—o—

Nelson Todd has rejoined the Hanson-Van Winkle-Munning Co., Matawan, N. J., as assistant to the president. He also has been re-elected a director of the company. **Charles W. Yerger,** for a number of years vice president in charge of sales and more recently executive vice president, has retired.

—o—

A. C. Fellinger has been made sales manager, power transmission machinery, Link-Belt Co., Chicago. He will have his headquarters at the Ewart plant, Indianapolis, filling the vacancy caused by the death of **C. Walter Spalding. H. F. R. Weber** has been named divisional sales manager, silent chain drives, with headquarters at the Ewart plant. **F. A. Hurd** will be divisional sales manager, industrial distributor sales, Chicago; **G. H. Unruh,** divisional sales manager, industrial distributor sales, Philadelphia; and **Harry Reisser,** divisional sales manager, automotive equipment sales, Indianapolis.

—o—

George W. Munson, electrical superintendent, American Tube & Stamping plant, Stanley Works, Bridgeport, Conn., is retiring Aug. 1. Mr. Munson has been connected with the steel industry for the past 42 years. He joined the American Tube & Stamping plant in 1903 and continued with the company after it became part of the Stanley works in 1926. Prior to that time he was master mechanic of the Bridgeport Division, Connecticut Railway & Lighting Co. Among the fields in which he has done notable pioneer work are: Application of synchronous motors to main mill drives; multi-speed motors on mills and auxiliaries; and flash welding techniques. He is also an authority on overhead crane operation and maintenance.

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Harry A. Feldbush has been named vice president in charge of engineering, Worthington Pump & Machinery Corp., Harrison, N. J. **Ralph M. Watson,** formerly chief engineer of the Centrifugal Engineering Division, has been appointed assistant to Mr. Feldbush.

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Brig. Gen. Isaac W. Ott, who served with the U. S. Strategic Air Forces in Europe, has assumed new duties as chief, Air Technical Service Command, Maintenance Division, Wright Field, Dayton, O. **Maj. Gen. Kenneth B. Wolfe,** chief of engineering and procurement, ATSC, has been ordered overseas for an undisclosed assignment. Deputy commanding generals and acting deputy commanders for the ATSC are: **Col. Ralph Nemo,** acting deputy commanding general, personnel; **Col. John M. Hayward,** acting deputy commanding general, intelligence; **Maj. Gen. B. W. Chidlaw,** deputy commanding general, engineering; **Maj. Gen. L. T. Miller,** deputy commanding general, supply; and **Maj. Gen. Elmer E. Adler,** deputy commanding general, plans. **Col. Turner A. Sims,** chief of administration, ATSC, has been transferred to the command's headquarters in Washington. **Col. Kenneth H. Bitting,** until recently director of personnel for U. S. Strategic Air Forces in Europe, succeeds Col. Sims.

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W. L. O'Brien has been promoted to manager, Stainless Steel Division, Jessop Steel Co., Washington, Pa. Mr. O'Brien formerly was district manager in Indianapolis where he joined the Jessop organization in May, 1943. He had served previously as metallurgist at the Carnegie-Illinois Steel Corp. mills in Gary, Ind., and also had worked in the research departments of both American Can Co. and Continental Can Co.

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Leon J. Wise, formerly assistant to executive vice president, Allied Steel Castings Co., Chicago, has been made general manager. **Harold G. Evans,** plant superintendent, has been advanced to works manager and **William Harrison,** foundry superintendent, has become plant superintendent.

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W. A. Atkins, vice president, E. C. Atkins & Co., Indianapolis, has been appointed president of the recently organized Indianapolis City Aviation Commission.

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John L. Collyer, special director of rubber programs, War Production Board, has resigned to return to B. F. Goodrich Co., Akron, of which he is president. He will be succeeded by **Robert S. Wilson,** vice president, Goodyear Tire & Rubber Co., Akron.

—o—

Carl E. Anderson has been named director of industrial relations, Warren City Mfg. Co., Warren, O. Mr. Ander-

son has been employed at the company and its predecessor, Warren City Tank & Boiler Co., since October, 1942. Previously he was with Westinghouse Electric Corp., Pittsburgh, for several years.

—o—

Frank T. McCue has been named chief, Plate and Shape Branch, Steel Division, War Production Board. In reporting this appointment in the July 23 issue of STEEL, the branch was inadvertently referred to as the Plate and Sheet Branch.

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Stewart A. Huge, formerly manager of production planning for the Central Division, Continental Can Co., New York, now is administrative assistant in New York. **W. W. Bartholomew** has been transferred from New York to Chicago to succeed Mr. Huge. **George E. Garland** has been appointed division manager of production planning for the Eastern Division. **John S. Raleigh** is acting manager of production planning for the Pacific Coast Division.

—o—

Howard A. Darrin, automotive stylist and engineer, has joined Graham-Paige Motors Corp., Detroit.

—o—

R. B. Ferris, Syracuse, N. Y., recently was named agent for Rosan fastening units manufactured by Bardwell & McAlister Inc., Hollywood, Calif. His territory consists of New York and New England. Mr. Ferris also represents Cleveland Cap Screw Co., and Defiance Automatic Screw Co.

—o—

Glenn Sayther succeeds **Ray F. Landis,** who has retired, as manager, Ahlberg Bearing Co., Chicago. Mr. Saythe**r** has been associated with the Minneapolis branch of the company since 1929.

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Curt Loeser, Milwaukee, has been appointed Wisconsin representative, American Gas Furnace Co., Elizabeth, N. J.

—o—

Mario Sein has been appointed chief, Accounts and Audits Branch, Division of Administrative Services, War Production Board, succeeding **Francis N. Fine,** who has resigned to re-enter business as a partner in the Muskegon Auto Parts Co., Muskegon, Mich.

—o—

Dr. Wendell P. Metzner is being transferred to Monsanto Chemical Co.'s Central Research Laboratories at Dayton, O., where he will head the flexible-type high polymer group. He will be succeeded as a group leader in the Organic Chemicals Division research laboratories, St. Louis, by **Harold L. Hubbard. Dr. Alfred G. Rossow** is being transferred from Dayton to the St. Louis research laboratories.

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Dairy Barn Equipment Association meeting at Chicago, re-elected officers and executive committee. They are: **H. B. Mogran,** Harvard, Ill., president; **R. W. Louden,** Fairfield, Iowa, vice president; **R. C. Hudson,** Chicago, treasurer; **W. Floyd Keepers,** secretary and counsel; and **Frank J. Zink,** co-counsel. Offices of the association are in the Board of Trade Building, Chicago.

CHARLES A. POWEL

GEORGE M. DAVIS

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Charles A. Powel, newly-appointed chief of the Electrical and Radio Branch, Allied Control Commission, is taking leave of absence from his position of headquarters engineering manager, Westinghouse Electric Corp., Pittsburgh. Mr. Powel is president, American Institute of Electrical Engineers.

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Sidney E. Johnson, Atlanta, has been appointed southern regional manager in the sales department, Manufacturing Division, Crosley Corp., Cincinnati.

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Charles H. Granger, general manager, Waterbury Tool Co., Waterbury, Conn., has been made general manager, Wheeler Insulated Wire Co., Bridgeport, Conn. Mr. Granger will hold both posts.

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Robert D. Burns has been elected treasurer, Ekco Products Co., Chicago, succeeding **Mortimer Marder,** who has resigned. Mr. Burns will also serve as treasurer of two subsidiary companies, Geneva Forge Inc., and Sta-Brite Division.

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William F. Huggins has been appointed manager of foreign sales, Le Roi Co., Milwaukee. Mr. Huggins was with the foreign economic administration in Washington and has spent several years in Argentina and Chile.

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Edward H. Schoonmaker, Syracuse, N. Y., has been named sales engineer for the Southwestern district office, St. Louis, Baldwin Locomotive Works, Eddystone, Pa. Mr. Schoonmaker joined Baldwin last November as a diesel service engineer.

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T. D. Slingman recently was named manager, industrial sales, Baldwin-Hill Co., Trenton, N. J. He formerly was vice president in charge of mechanical sales, Dayton Rubber Mfg. Co., Dayton, O.

—o—

George M. Davis has been appointed sales manager, Ammunition Division, Western Cartridge Co., East Alton, Ill. Mr. Davis also will continue as assistant sales manager, Winchester Repeating Arms Co., and Bond Electric Corp., New Haven, Conn., the three companies being divisions of Olin Industries Inc. Mr. Davis started at Western Cartridge Co. in June, 1914, as an employee in the metallic manufacturing department, in 1919 entering the sales department and later becoming district manager in charge of Western-Winchester sales in 12 central states. Mr. Davis became assistant sales manager in 1942.

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E. W. Smith, comptroller, Kewaunee Shipbuilding & Engineering Corp., Kewaunee, Wis., for the past two years, has been appointed general manager succeeding **Hugh C. Brogan,** resigned.

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George L. Hockensmith has been appointed deputy director, Construction Bureau, War Production Board, succeeding **Alexander Milne Jr.,** resigned. **Raemey A. Burton** succeeds Mr. Hockensmith as chairman of the Construction Requirements Committee of the bureau.

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J. B. Swift, formerly sales engineer, Hydro-Blast Corp., Chicago, has joined Morton L. Pereira & Associates, Chicago, successors to Frank D. Chase Inc., Chicago.

—o—

Association of Transportation Committee Chairmen, Milwaukee, has elected the following officers: **Andrew Holmes,** Cutler-Hammer Inc., president; **Ken Clark,** Allis-Chalmers Mfg. Co., supercharger plant, vice president; **Harold R. Langlois,** Kearney & Trecker Products Corp., secretary; **Romand Grimscheid,** International Harvester Co., treasurer. Members elected to the board of directors include: **Lois Phillippi,** Cleaver-Brooks

B. S. CHAPPLE JR.

Assistant to vice president, sales, United States Steel Corp. of Delaware, Pittsburgh, noted in STEEL, July 23, p. 96.

W. A. DeRIDDER

Elected president and general manager, Adel Precision Products Corp., Burbank, Calif., noted in STEEL, July 16, p. 104.

F. J. Van POPPELEN

Who has been appointed vice president of the Salem Engineering Co., Salem, O., as noted in STEEL, July 23, p. 96.

Co.; **R. E. Rhode,** Globe-Union Inc.; **H. A. Schultz,** Klug & Smith Co.; **Chester Groth,** Chain Belt Co.; **John Verfurth,** L. J. Mueller Furnace Co.; **Albert Moorbeck,** Nordberg Mfg. Co.

—o—

Fred E. Harrell, for the past two years chief engineer, Reliance Electric & Engineering Co., Cleveland, has been appointed general works manager, succeeding **S. B. Taylor.** Mr. Taylor has resigned as manufacturing vice president but will remain a director. **William R. Hough,** product development engineer, has been named chief engineer.

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Norma-Hoffmann Bearings Corp., Stamford, Conn., announces the following changes in its home office sales executive personnel: **R. L. Miller,** sales manager; **E. M. Beers Jr.,** and **G. V. Titsworth,** assistant sales managers; **C. L. Brown Jr.,** assistant to the sales manager, and **W. G. Sargent,** manager of distributors' sales.

Through a typographical error the company name was misspelled in the original item in STEEL, July 23.

OBITUARIES . . .

Charles Snelling Robinson, 81, who retired as vice president, Youngstown Sheet & Tube Co., Youngstown, O., in 1939, died July 22, at his home in that city. Mr. Robinson had been connected with the Youngstown company since 1906. He was graduated from Massachusetts Institute of Technology in 1884 and first entered the steel industry as an assistant chemist with the Joliet Steel Co., Joliet, Ill. in 1885. His next position was as chemist with the Colby Mine Co., Bessemer, Mich. For a time he was a partner of Robinson Bros., Duluth, Minn., assayers and chemists. In 1890 Mr. Robinson became chief chemist, Illinois Steel Co., Joliet, Ill., works, and for a year was manager of blast furnaces, Dunbar Furnace Co. From 1892 until 1906 he was connected with the Colorado Fuel & Iron Co., at Pueblo, Colo. He joined the Youngstown Sheet & Tube Co. as a vice president in 1906. During his years of service with that company he also served as president and director of several of its subsidiary companies.

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Franklin Hardinge, 78, inventor of the oil burner bearing that name, and chairman, Hardinge Oil Burner & Mfg. Co., Chicago, died July 21, in Goshen, Ind.

—o—

Victor A. Jevon, 49, assistant sales manager in charge of Pittsburgh district sales, Jones & Laughlin Steel Corp., Pittsburgh, died July 18 in that city. Mr. Jevon had been with Jones & Laughlin since April, 1938, when he was appointed district sales manager in the Baltimore office. The following October he was transferred to Pittsburgh as assistant to the vice president in charge of sales. He was promoted to his latest position in May, 1945.

—o—

William H. Rowe, 61, inventor of the first automatic cigarette vending machine, and president for 15 years of the Rowe Mfg. Co., New York, died July 22, in Delmar, Calif. He retired in 1939.

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Roy R. Gibson, manager, automotive replacement sales, Johnson Bronze Co., New Castle, Pa., died July 17.

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John E. Thomas, 57, managing director, Canedy-Otto Mfg. Co., Chicago Heights, Ill., died July 19, in Chicago.

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Arthur J. Sikora, 39, Cincinnati, engineer of maintenance, Wright Aeronautical Corp., was killed accidentally July 17, in Chicago.

—o—

Harry J. Burlington, 67, president, Burwak Elevator Co., New York, died recently at his home in Montvale, N. J.

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Clarence A. Hight, 77, at one time chairman of the board, United States Smelting, Refining & Mining Co., Boston, died recently at Annisquam, Mass.

—o—

George O. Knapp, 90, former president and chairman of the board, Union Carbide & Carbon Corp., New York, died July 22 in Santa Barbara, Calif. Mr. Knapp was appointed president and chairman in 1917, serving until 1929 when he became honorary chairman. He retired in 1933.

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Charles H. Aldrich, 66, technical consultant and superintendent of refineries, United States Metals Refining Co., Carteret, N. J., died July 20 at his home in Elizabeth, N. J.

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Edmund F. Bainbridge, 59, owner and president, Anti-Corrosive Metal Products Co., Castleton on Hudson, N. Y., died July 20.

—o—

Lawrence L. Eiben, 59, owner, National Blower Co., Cleveland, died July 21 at his home in that city.

—o—

William J. Heyl, 56, vice president, Heyl & Patterson Inc., Pittsburgh, died July 23 in that city.

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Henry F. Miller, 57, sales promotion manager, Gould Pumps Inc., Seneca Falls, N. Y., died recently in Syracuse, N. Y.

—o—

Edward C. Schwingel, 80, president, Lake Erie Mfg. Co. Inc., Buffalo, died recently.

—o—

Arthur S. Beves, 88, at one time treasurer and assistant secretary, General Electric Co., died July 20 at his home in Bantam, Conn. Mr. Beves worked with the late Thomas A. Edison in the development of the electric light.

Pig Iron Output In 1944 Gained Shade Over 1943

Domestic ores yield better than imported. Nearly two tons raw materials used to one ton of iron produced

DOMESTIC production of pig iron, exclusive of ferroalloys, in 1944 totaled 61,003,759 net tons, an increase of less than one-half of one per cent over the prior record year of 1943, according to the Bureau of Mines. Output in 1944 included 60,944,293 tons using coke and 59,466 tons using charcoal.

Shipments of pig iron also increased only slightly in quantity and value in 1944 over 1943. Shipments totaled 60,995,977 tons, valued at $1,278,981,313. Values represent approximate amounts received for the iron f. o. b. furnace and do not include freight cost, selling commissions and other items figured in some market prices published in trade journals. Shipments by grades in 1944 were as follows: Basic, 46,289,976 tons; bessemer, 9,278,387 tons; foundry, 2,405,222 tons; malleable, 2,145,823 tons; low phosphorus, 486,362 tons, charcoal, 55,705; all others, not including ferroalloys, 334,502.

Production in 1944 required 109,531,216 tons of iron ore, sinter and manganiferous ore, 3,544,025 tons of mill cinder and roll scale, 3,518,855 tons of slag, 2,135,498 tons of purchased scrap, 146 tons of pyrites cinder and 49,901 tons of miscellaneous materials, an average of 1947 tons of metalliferous materials, exclusive of home scrap and flue dust, per ton of pig iron.

Of 1944 output it is estimated that 119,120 tons were made from 255,449 tons of foreign ores, including supplies from Africa, Canada, Cuba, Mexico and Sweden, indicating an average yield of 46.63 per cent from imported ore. Domestic ore and sinter, 109,374,151 tons, and other materials, 9,248,425 tons, total 118,622,576 tons, were reported used in production of 60,884,639 tons of pig iron, indicating an average pig iron yield of 51.33 per cent from domestic materials. In addition, 1,519,226 tons of home scrap and 129,166 tons of flue dust were used in pig iron manufacture in 1944.

Manganese Ore Shipments Close to All-time Record

Shipments of manganese ore containing 35 per cent or more natural manganese in 1944 totaled 247,616 net tons, compared with 205,173 tons in 1943, according to figures by the Bureau of Mines. Output in 1944 was second only to the record year 1918, when 342,573 tons were shipped from domestic mines.

Of the 1944 tonnage, the bureau reported, 241,170 tons were metallurgical ore, 6224 tons were battery grades and 222 tons were for miscellaneous uses.

Shipments of ferruginous manganese containing 10 to 35 per cent natural manganese in 1944 were 297,136 tons, compared with 471,593 tons in 1943.

Coke Industry Sets New Production Mark in 1944

In 1944 the coke industry, with increased by-product coking capacity, surpassed all earlier production records. According to the Bureau of Mines combined production of by-product and beehive coke reached 74,037,817 net tons in 1944, an increase of 3 per cent over 1943. This resulted in a 5 per cent increase in by-product coke and a decrease of 12 per cent in beehive. Coke requirements paralleled output and calculated consumption for all uses in the United States increased 2 per cent over 1943, amounting to 72,971,401 tons. About 80 per cent of consumption was as metallurgical fuel in blast furnaces. Coke used for other purposes, in foundries and other industrial plants, declined slightly, while consumption of domestic coke increased 37 per cent over 1943.

SUMMARY OF PRODUCTION OF IRON AND STEEL PRODUCTS

(Net tons)

Product	1944	1943	1942	1941	1940
Pig Iron:					
Basic	45,886,008	45,374,662	43,532,865	39,759,841	33,987,734
Bessemer	9,756,836	10,258,788	9,865,220	9,522,343	7,386,320
Low phosphorus	474,686	538,832	562,672	474,428	448,956
Foundry	2,190,681	2,059,501	2,546,530	2,760,827	2,292,175
Malleable	2,494,659	2,393,241	2,399,520	2,417,137	1,832,401
Forge or mill	.....	.....	.....	1,074	3,590
All other	204,569	185,646	169,137	164,901	120,490
Total	61,007,439	60,810,670	59,075,944	55,100,551	46,071,666
Ferro-Alloys:					
Ferro-manganese and spiegel	809,638	803,623	785,103	730,009	746,896
Ferro-silicon	837,944	923,450	880,843	729,716	498,832
All other	211,177	232,204	161,414	126,328	81,135
Total	1,858,759	1,959,277	1,827,360	1,586,053	1,326,863
Total Pig Iron & Ferro-Alloys	62,866,198	62,769,947	60,903,304	56,686,604	47,398,529
Steel (ingots & steel for castings):					
Open hearth—basic	79,168,294	77,207,870	75,183,065	73,312,851	60,882,840
" " —acid	1,195,659	1,413,934	1,318,892	1,076,768	690,243
Bessemer	5,039,923	5,625,492	5,553,424	5,578,071	3,708,573
Electric	4,237,699	4,589,070	3,974,540	2,869,256	1,700,006
Crucible	25	146	2,010	2,313	1,024
Total Steel	89,641,600	88,836,512	86,031,931	82,839,259	66,982,686
Finished Hot Rolled Products:					
Plates—universal	1,676,100	1,603,247	1,825,372	1,265,964	762,644
" —sheared	11,447,323	11,515,693	9,974,228	4,933,611	3,560,764
Sheets—hot rolled	10,339,080	9,403,002	9,199,273	13,602,685	11,705,956
Strip	2,593,107	2,125,221	1,901,153	2,540,074	2,077,744
Strip and sheets for cold reduced black plate and tin plate	4,177,865	2,982,379	3,281,860	4,328,111	3,103,627
Hoops	68,596	60,884	93,071	108,722	97,074
Cotton ties and baling bands	35,892	46,212	54,895	44,461	44,918
Black plate	556	21,098	238,199	490,811	521,924
Total	30,338,519	27,757,736	26,568,051	27,314,439	21,874,651
Bars—merchant	10,532,250	11,383,501	10,110,222	9,143,455	6,459,263
" —concrete reinforcement	628,944	474,546	1,829,760	1,835,243	1,425,998
Total	11,161,194	11,858,047	11,939,982	10,978,698	7,885,261
Structural shapes—heavy	3,824,106	3,349,377	4,944,670	4,670,782	3,355,658
" " —light	852,375	1,226,467	871,651	1,053,454	876,688
Sheet piling	128,879	36,970	152,688	209,183	186,125
Rails	2,490,656	2,126,996	2,096,159	1,927,851	1,678,986
Splice bars and tie plate bars	862,383	583,798	745,150	742,382	515,928
Skelp	3,049,682	3,022,398	2,900,741	3,637,574	2,709,000
Blanks or pierced billets	3,677,631	3,470,797	3,039,174	2,945,921	2,320,966
Wire rods	4,646,298	4,693,798	4,632,017	5,268,423	4,351,848
Rolled forging billets	3,762,575	3,796,931	2,881,687	1,769,816	919,826
Blooms, billets, etc., for export	468,088	825,966	1,194,636	1,158,519	1,677,905
Car wheels (rolled steel)	291,529	233,915	234,794	269,911	191,102
All other	250,064	309,477	244,514	377,234	116,425
Total Hot Rolled Products	65,808,979	63,292,673	62,445,914	62,324,187	48,660,369

Data from American Iron & Steel Institute.

WING TIPS

Lockheed engineer says jet propulsion has no limits of altitude and speed. Predicts wide adaptation in all types of airplanes, including helicopters, within 10 or 15 years after the war. Sees increase in comfort and safety

By HALL L. HIBBARD*
Vice president and chief engineer,
Lockheed Aircraft Corp.

JET propulsion is unquestionably one of the greatest advances to come out of the intensive research and development of the war years. I think that jet propulsion has placed man in the entrance to the final phase of his efforts to propel himself through space.

Jet propulsion is just coming out of the laboratory. We have learned a lot about this new technique in the last few years. But we have barely made a beginning. Much of what we know is still covered in secrecy and will be until the war in the Pacific has ended. Enough can be told, however, to trace the outlines of future peaceful development.

To win the war we needed faster airplanes. But the conventional propeller-driven airplane had just about reached its top speed when ships passed the 400 mile-an-hour mark.

The urgency of the need brought the answer, which was jet propulsion, far sooner than it would have come except for the awful haste of war. This age-old—yet at the same time brand new—idea had been stalled in the laboratory for years before the threat of superior enemy planes forced it out.

Need for much faster fighter planes first became apparent early in 1943. In June of that year we were asked at Lockheed to develop a fighter airplane around the Whittle jet engine that had been designed by the British.

Only 143 days after the Army made its request, Clarence Johnson, chief research engineer at Lockheed, had designed and supervised the construction of a jet fighter, our P-80 Shooting Star.

Researchers for years have been studying gas turbines and the metallurgical problems connected with these turbines. At General Electric, for example, the turbo-supercharger has been in development ever since 1918. This gas turbine is the father of the powerful jet engine of today.

It is interesting to note that 20 years elapsed from the date of the first successful test of a turbo-supercharger on the summit of Pikes Peak until it was perfected and adopted by the Army in 1939—and first used successfully on a fighter airplane, I might add, on our own P-38 Lightning.

But before we talk any more about jet propulsion let's make sure we have the theory completely straight.

We can illustrate the principle involved in jet propulsion by imagining two spheres, A and B. These spheres, we shall say, have been filled with illuminating gas with a spark plug in each to explode it. Sphere A is solid but Sphere B has a small opening in one side.

We ignite the gas in Sphere A with the spark plug. There is an explosion, not strong enough to shatter the sphere, but enough to cause a sudden increase in the pressure inside. This pressure is exerted against the inner sides of the sphere—equally against all points.

But because the pressure is equal at all points inside it does not move as a result of the explosion. The pressure against one side is canceled by the equal pressure against the opposite side. We would hear a sharp ping, but there would be no motion.

Now we repeat the experiment with Sphere B, which has an opening. Once again with the explosion sudden pressures are created. These pressures are exerted outward against the surface and are equal at all points. But at the hole the gases escape. There is no surface for them to push against there. At that point on the sphere the pressure is zero.

This means that all explosion forces are canceled, as before, except those acting on the surface of the sphere directly opposite the hole. Here we have a positive pressure with no opposite pressure canceling it out. The result is obvious. The sphere will be pushed in the direction of the positive pressure—away from the opening.

Unopposed Forces Utilized

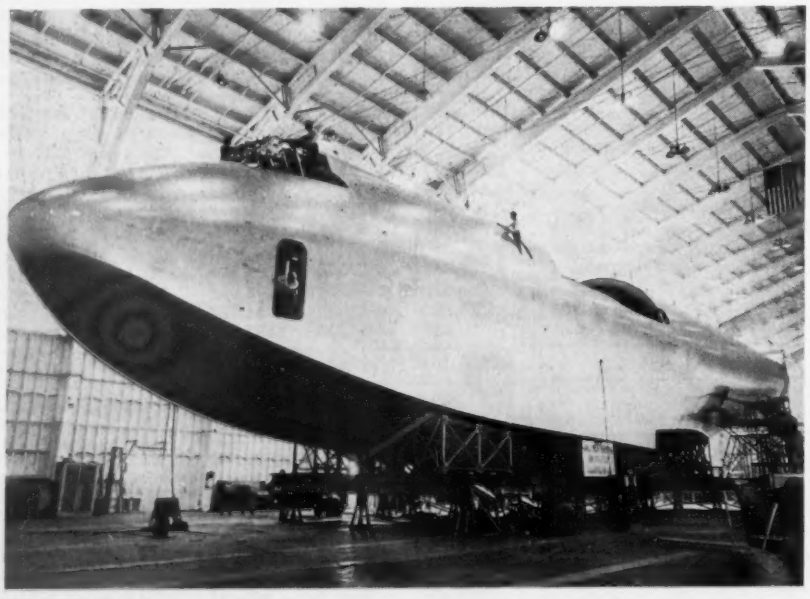
That's all there is to it. Jet propulsion is obtained by the creation of unopposed forces inside a combustion chamber. Notice particularly that the movement of the sphere does not result from the blast of hot gases pushing against a cushion of air—this is a popular misconception.

There are three basic types of jet engines. First, the ultimate form is the rocket which carries all the elements for combustion within itself. With the perfection of rocket motors, in a very few years, we will be able, if we wish, to fly above the earth's atmosphere and attain speeds without limit.

The second type is the pure jet engine which depends on air drawn from the atmosphere, mixed with fuel, and ignited in the combustion chamber. The Shooting Star is a pure jet airplane. Although it can fly very fast and very high, it can never fly outside the atmosphere, and it can never attain the maximum speeds that a rocket can reach.

Finally we have a compromise between the jet engine and the present arrangement. This will be a gas turbine that

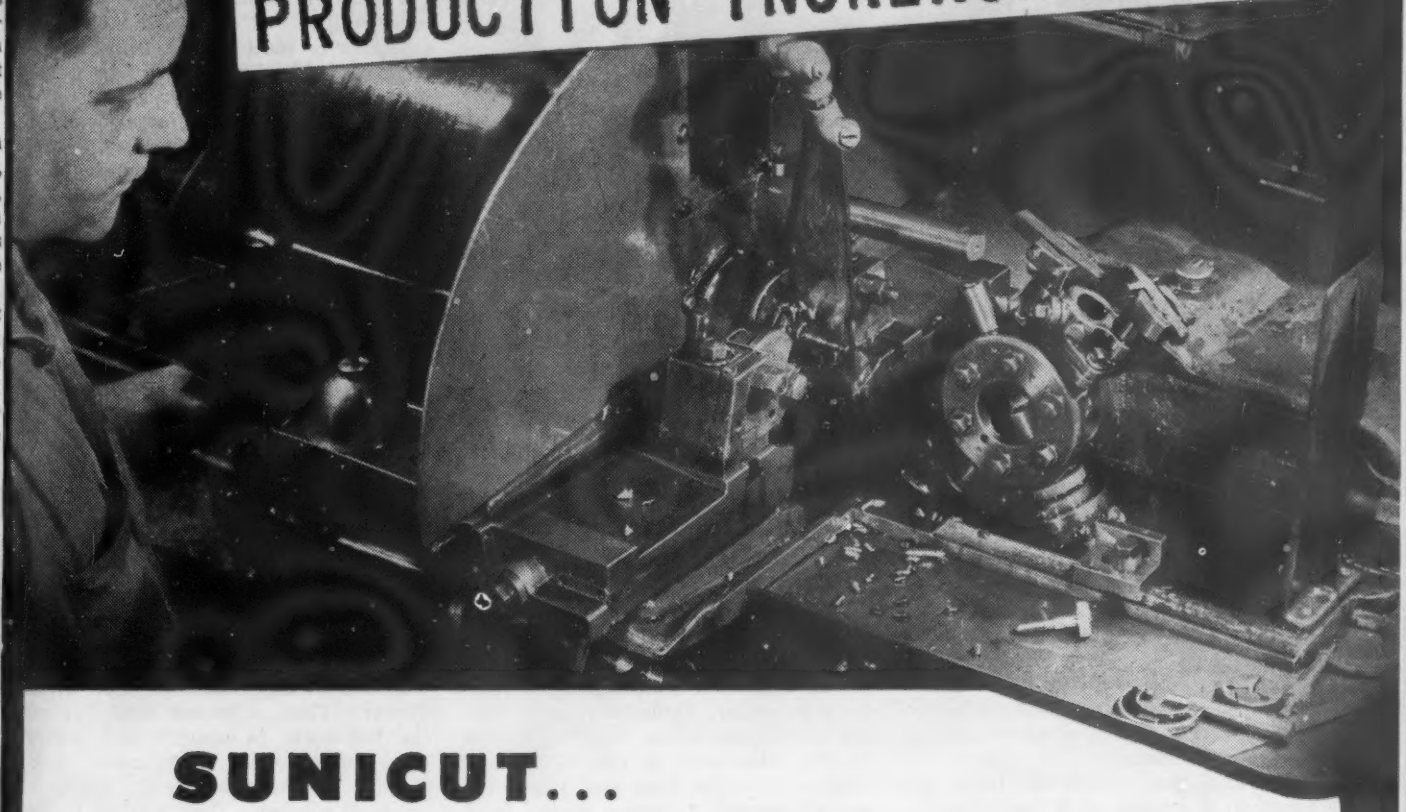
*Abstracted from a paper presented before the Los Angeles Junior Chamber of Commerce July 11, 1945.



TO CARRY 750: Here is the first picture of the hull of the "Hughes Hercules," huge cargo seaplane being built at Culver City, Calif. The hull is 220 feet long, 30 feet high and 25 feet wide and has a cargo space equivalent to two freight cars. Having a gross weight of more than 200 tons, the craft will be powered by eight 3000-horsepower engines. It will be able to carry 750 fully equipped troops nonstop from Honolulu to Tokyo. NEA photo

TOOL-LIFE UP 2½ TIMES...

PRODUCTION INCREASES 43%



SUNICUT...

Steps-Up Output of Aluminum Pieces from 700 to 1,000 Pieces a Day

One of the war-plants was producing important parts for binoculars and range-finders on a Browne & Sharpe Automatic Type 2-G machine. The operation consisted of boring, threading, forming, and knurling #17 ST 1½" aluminum bar-stock at 1,580 R.P.M. spindle-speed.

The cutting oil used at first did not give them the desired tool-life and production.

Then they consulted a Sun Cutting Oil Engineer who carefully surveyed the operating conditions. He recommended a change to Sunicut. Results . . . output jumped from 700 to 1,000 pieces a day . . . an increase of 43%. Formerly they had reground tools every 100 pieces. Now they regrind after every 375 . . . an increase of more than 2½ times in tool-life.

Machine-tools in large and small plants, like this, throughout the country have demonstrated the superior qualities of Sunicut. Sunicut protects tools, improves finishes, steps-up production. For complete data on Sunicut and Sun's other products for metal-working, call the Sun Cutting Oil Engineer in your territory, or write . . .

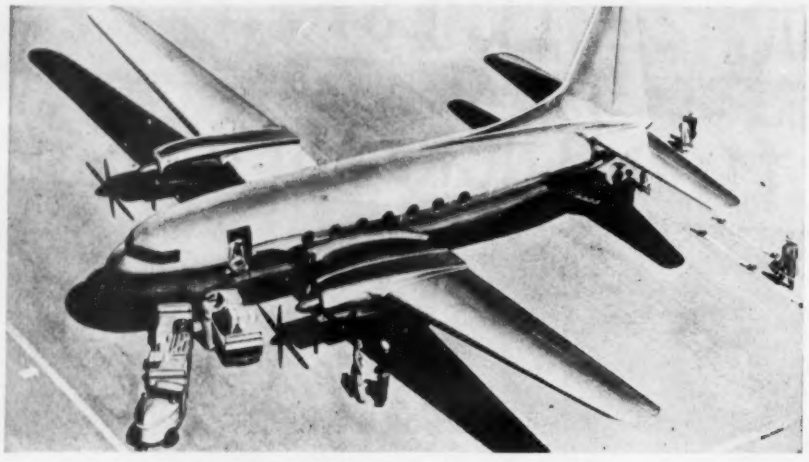
SUN OIL COMPANY · ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO

SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY



POSTWAR TRANSPORT: Here is artist's conception of new 30-passenger postwar transport plane to be built by Consolidated Vultee Aircraft Corp. Designated as the model 110, the twin-engine monoplane will have a cruising speed of 275 miles an hour and will carry an 8000-pound payload

revolves a shaft to which a conventional propeller is attached.

Nothing could be more simple than a rocket motor. Fuel is carried in tanks just as in our present airplanes. In addition there is a supply of oxygen in liquid form. Gasoline or alcohol are fuels used in rockets today, but intensive development is being carried on in this country and abroad to develop more efficient rocket fuels.

The fuel passes from the tanks and serves as a coolant as it flows through the outer jacket of the motor into the combustion chamber. Here it mixes with the oxygen. A violent continuous explosion takes place. The hot gases exhaust through a nozzle to the rear corresponding to the opening in the sphere's surface in our early analogy.

Powered by Pure Jet Engine

A pure jet engine powers the Lockheed P-80 Shooting Star today. As developed by General Electric for the P-80, it is the simplest, most easily maintained, as well as the most powerful aircraft engine ever built.

The air enters at the front and is compressed by a blower turning at high velocity. From the blower the air enters the combustion chamber, where it is mixed with fuel injected at high pressure. This mixture is burned in a continuous explosion heating the gases and expanding them violently.

There is no complicated ignition system in this engine. A spark plug sets off the initial explosion. Once the engine has started a small glow plug heats white hot and ignites the mixture.

From the combustion chamber the gases blast to the rear, where the jet nozzle permits them to escape. But first they rush through blades of a gas turbine wheel, driving it at high velocity. This turbine is connected by a shaft with the compressor blower, supplying the power necessary for the initial compression of the air.

Here again, you see, the creation of unopposed forces within the engine serves to drive the airplane forward.

One of the real difficulties in developing a jet engine, incidentally, lay in finding the proper alloys for the turbine wheel. The metal of this wheel must operate at white heat and still retain enough strength to rotate several times faster than an airplane propeller.

Finally we come to the combination engine that uses the power generated by a gas turbine to rotate a conventional propeller. This uses the same basic engine as the P-80 except that the shaft is extended forward and drives a conventional airplane propeller through proper gearing. This is a simple, efficient arrangement. It can be adapted to all types and sizes of airplanes designed for any speed below 500 miles an hour. I predict that our conventional reciprocating type airplane engine will be replaced by engines of this type in a very few years.

Let's get these various types straight in our mind. The turbo-jet engine driving a propeller very shortly will appear on all airplanes designed to travel at speeds under 500 miles an hour and at altitudes say, under 30,000 feet.

For higher speeds, say from 500 to 1500 miles an hour, there will be pure jet engines without propellers. These will be less efficient at the lower altitudes. But at 25,000 feet or over, running at full power, jet engines of this type will compare very favorably in efficiency with our conventional engines.

Finally there is the rocket engine, which will power the top military and commercial planes of the future. This means that the fighter or bomber of future years will be able to fly above the earth's atmosphere at practically any speed desired. When rockets are used on transports, they will be ships designed for long range, high speed flights more than 100 miles above the earth's surface.

The future transport will be of the pure jet type. It can be as large as is necessary to meet the demands of the traveling public for there will be plenty of power available to fly this ship. The cabin will be pressurized for flight above 50,000 feet. The luxurious comfort of this airplane will surpass anything you have known in the field of transportation.

In the jet transport traveling above the speed of sound, 10 miles above the earth, there will be no noise, no vibration, no sense of speed. Weather will make no difference at all since you will fly over storms. Radio navigational aids, already well developed, will permit you to land with perfect confidence on an airport that is zeroed in by fog, snow or what have you.

This airplane will not be built immediately. The industry needs a few years to get acquainted with jet propulsion. The airplane I have just described is 10 to 15 years away.

In the meantime you have something to look ahead to almost at once. The new high-speed, pressurized transport airplanes, developed since the start of the war, will go into airline operation within a year. These ships are fast, they are the last word in comfort and luxury, their pressurized cabins make overweather, year-around flight possible at sea level comfort. Their cruising speeds will be in the neighborhood of 300 miles an hour at 20,000 feet. Our Constellation will incorporate all of these improvements when commercial production begins in February next year.

May Be No Limit on Speed

We've been dealing in pretty high speeds today. But we haven't reached the limit yet by any means. As a matter of fact, I'm not so sure there is a limit. Planes traveling within the earth's atmosphere will not be able to fly faster than about 1500 miles an hour because the friction of the air will heat them above the point where cooling is practical. At 1500 miles an hour a temperature rise of some 400 degrees would be experienced. To avoid that we will go very much higher with our rocket airplanes, outside the atmosphere, where there is no air to create drag or cause excessive heating of the ship.

Flying outside the earth's atmosphere there is theoretically no limit to the speeds that can be attained. If we have somewhere to go fast, there is no reason why we won't be able to travel 10,000, yes, 100,000 miles an hour. Mind you, we shall have to have some reason for going that fast. But I know of nothing now that will prevent our doing so if we so choose.

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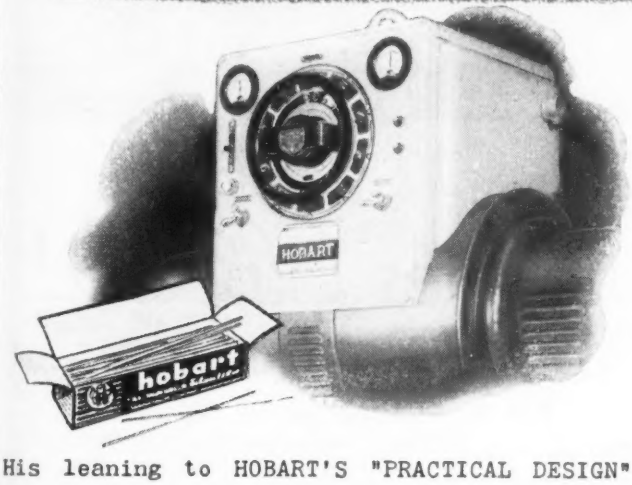

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Heaped up barges and small boats bring in food, ammunition and other supplies of American fighters at a Pacific base. NEA photo

Few Procurement Changes Expected

Navy's expansion program virtually completed and needs in future will be principally for ship repair and service and for expendable items already in production. Duration of war is open question. Full offensive to be continued until victory

By E. C. KREUTZBERG*
Editor, STEEL

LEADING question of observers touring the Pacific war theaters is bound to be: How long will the war out there last? It is a question to which our top officers would like the answer, since it would be a help to them in their planning to know when the pipeline through which flows all the components of our war effort can begin to be shut down. It is a question in the minds of vast numbers of men in all ranks eager to know how much longer it will be before they again can be with their families and in familiar surroundings back home.

The answer comes to this, as heard in the Pacific: No one on our side has the least idea as to how much longer the war will last. It is entirely a case of how crushing a defeat will have to be handed to the Japanese before they have had enough.

In conversations with our officers in the higher echelons, however, there is frequent speculation about one factor that might conceivably shorten the war. That is the ownership of the Japanese economy by a limited number of wealthy families, with the emperor the leading holder of railroad, industrial and shipping securities. Japanese business leaders see their manufacturing plants, cities and ports progressively destroyed by bombs, and their ships blasted from the surface of the ocean. Isn't it possible, some of our officers suggest, that they will tire of this spectacle and initiate a campaign to discredit the military leaders in the eyes of the Japanese public, and thus pave the way for an early peace?

This is a question which to Americans sounds like a logical one. The Japanese, however, think differently about a lot of things than we do, as they have demonstrated time and again in this war. Our people simply mention this as a possibility. At the same time, they do not regard it as a probability. The only safe position for our side to assume, they believe, is that we must go on fighting the Japanese until they are totally defeated—a process that necessarily will take a lot more time and effort and sacrifice.

Another question whose answer it is natural to seek in the Pacific theaters is: Can we superimpose, on top of the weight of men and materiel we are throwing against the Japanese, the weight of men and materiel which we threw against the Germans? This question is important because it seeks to explore the extent to which our industry can be reconverted while the Japanese war still is in progress.

The answer, in the opinion of leading Navy officers in the Pacific, is: No. The end of the war in Europe will permit a sharp increase in the weight of our offensive against Japan, they said, but the acceleration cannot reach the point where the future weight to be thrown against Japan can be equal to the sum total of the weight previously thrown simultaneously against Japan and Germany. Just how much of an increase there will be in the weight of our effort in the Pacific is not known, and would not be disclosed if it were known. But there is a limiting factor, they say — and that is transportation. Everything we use in the Pacific, these officers point out, has to be hauled great distances,

*This is the second of two articles by the author presenting his observations on a recently-completed 21,000-mile tour of Pacific bases sponsored by the Navy Department. The first article appeared in STEEL, July 23.

and we can haul only as much weight of materiel as is within the capacity of our Pacific ports and the Panama canal.

In the opinion of top Navy officers in the Pacific, therefore, there should be substantial reconversion of industry from war to civilian products while the Japanese war still is underway, and the trend should become increasingly apparent over the next few months.

Two other factors should have a bearing on the complexion of industrial activities in this country. The first is that the great expansion program of the Navy has been nearly completed, and from this time forward a large amount of the Navy's needs, other than for food, ammunition and other expendable items, should be for repairs to ships and other facilities. The second factor is that no sweeping changes in the Navy's procurement program are anticipated during the remaining period of the Japanese war. Guns, ammunition, planes, prefabricated buildings, shoes and the countless other items used in the Pacific war all are in a satisfactory state of development. Hence procurement programs from now on should be fairly stable—changed only as design improvements develop in normal tempo. That is, tooling and operation of production lines should be disturbed much less frequently during the remainder of the Japanese war than during the early war period.

Preparedness Highly Valued

Another lesson learned by our fighting men in the Pacific is the value of military preparedness. They know that freedom and safety can be enjoyed only by peoples able and ready to defend themselves against aggressors; the mere wish and will to freedom and safety are not enough. Our men have experienced instance after instance where peaceable people have been decimated by this war. At one western Pacific atoll, for instance, all the able-bodied young natives were removed by the Japanese to one of their island strongholds. Those remaining comprised old or very young people. The sprinkling of youngsters left was sufficient to set up, say, some six or eight families over the next ten years. These people are friendly and have the reputation of never harming anyone—yet here is a case where they are threatened with extinction. Our men have run across many such instances in the Pacific, and they can be counted on to raise their voices, when they get back home, in favor of the maintenance of a big Army and Navy as the price of our national safety.

A development significant to industry is the spirit of approval, approaching reverence, that our officers and men feel toward American materials-handling and labor-saving equipment. While organized labor in the United States dropped its fight against machinery many years ago upon finally realizing that machinery multiplies man's productivity and that economic ills spring from other causes, machinery really has come into its own in the Pacific. Not only does the observer, wherever he goes in that vast area, see machinery do all sorts of jobs in a hurry, but he hears our people cite machinery and its performance as a high manifestation of Americans' superior way of getting things done.

"Despite the popular conception, the Japanese fighting man is not out there just to die for his emperor; he is more highly trained and resourceful in battle than our own men who have not as much training," said an officer with active experience in the Okinawa campaign. "It is because of our superior weapons, and because our mass production manufacturing methods enable us to throw them at him in overwhelming weight that we are able to annihilate him."

On Iwo Jima, where the Japanese forces were assigned to individual zones so as to be familiar with every detail of a small area, a Japanese prisoner saw a road scraper at work shaping up an airstrip, where all the old surface identification marks had disappeared. "That machine do in one day what Japanese do in 200 days," said the prisoner as he gazed at the scraper in awed wonder.

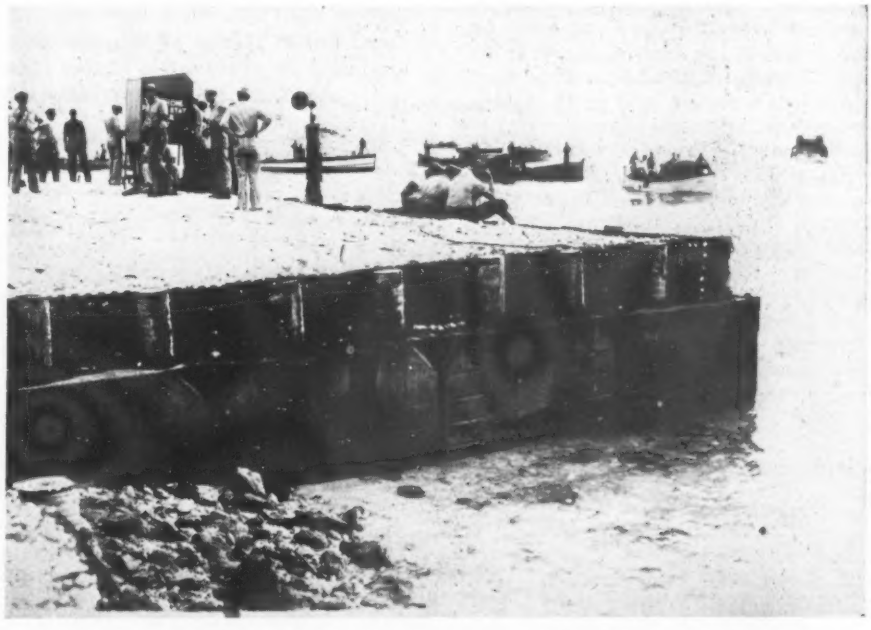
Our people tell how the Seabees built a fine, spiral roadway up Mt. Suribachi in two days, how roads, airstrips, and extensive military installations were built in unbelievably short periods of time with the aid of American machinery. When they get back home they will bring back not only an acceptance of labor-saving equipment but a genuine pride in the incredible quantity of work which Americans can do in a given time with mechanical devices of their own creation.

The prestige of standardization also has gained greatly among our men in the Pacific. They take Quonset huts for granted, and set about assembling them on the ground secure in the knowledge that the prefabricated parts will fit together perfectly. Interchangeability of parts is a feature of the supply system all over the Pacific. In fact, the complaints that are heard on this score deal principally with such interchangeability as has not yet been accomplished. Loud complaints were heard in one area, for example, over the parts problem presented by the fact that motor trucks made by three different manufacturers had been sent to that area; the men commented freely that this was a "dumb" performance and that if the supply people had sent only one make of trucks to that area the maintenance job would have been much simpler.

Out of this experience in the field, the Navy now is deeply concerned with the problem of interchangeability of parts of different manufacturers. As an example, internal combustion engine parts originally listed under each manufacturer's stock numbers now are cross-indexed to show interchangeability of parts among the different makes of engines. This change has made the investment in spare parts inventories go further; also, it has reduced time in making essential repairs and has resulted in increasing the percentage of engines that are "operational" at any given time.

These experiences in the Pacific can

(*Please turn to Page* 152)



Versatile steel landing mats find another use in the Pacific area, as retaining wall. By the end of 1945 *more than three-quarters of a billion square feet of this matting will have been manufactured in the United States. Chiefly used for landing mats, the material also is in service on roadways, jungle footpaths, bridge decks and footways, framework for buildings, shelving, bases for thatched walls and roofs, and other uses*

Carnegie Starts Modernization in Chicago District

Contracts being let for installation of equipment at sheet and tin mill. Bids sought for rebuilding blast furnaces

CARNEGIE-Illinois Steel Corp. is preparing to get under way shortly with its recently announced modernization and improvement program at its Gary and South Chicago plants.

Contracts are being let for installation of equipment at the Gary sheet and tin mill which will increase capacity for cold-reduced tin plate by approximately 104,000 tons annually. This equipment will include an 80-inch hot strip mill and additional annealing furnaces. From 12 to 18 months will be required to complete the work.

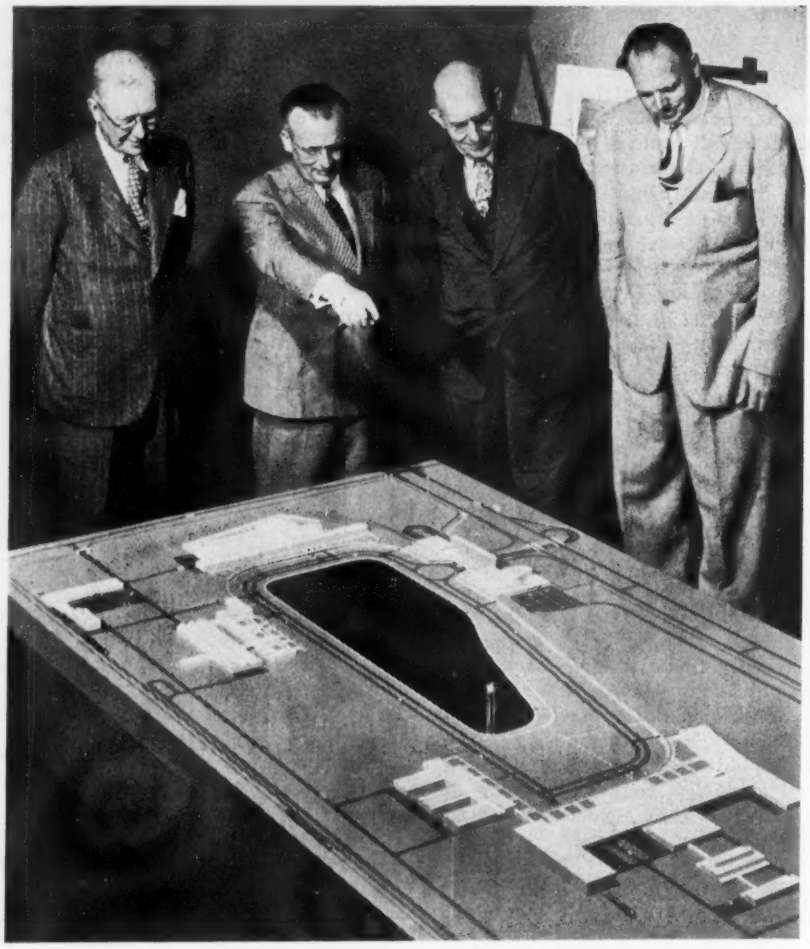
Bids are being sought for rebuilding and enlarging No. 6 blast furnace at the Gary steelworks from a daily rated capacity of 870 tons to 1508 tons per day. Rebuilding, to take about a year, will include new stoves, additional gas washing capacity and other auxiliaries for the larger furnace, as well as a belt conveyor coke handling system and other stockhouse iron and cinder handling equipment. This furnace, built in 1910, and last completely relined in 1928, went out of blast April 9.

Contracts also are being sought for complete rebuilding and enlarging of No. 7 and No. 9 blast furnaces at the South Chicago steelworks. This work, which will occupy a year to 15 months, also will include replacing ore and coke pockets at blast furnaces Nos. 5 to 10, inclusive. No. 7 furnace, built in 1910 and last completely relined in 1922, has a rated capacity of 676 tons per day. It has not operated since July 3, 1944. The No. 9 furnace, expected to continue operating until Sept. 1, was built in 1909, was last completely relined in 1930, and has a rated capacity of 713 tons per day. After rebuilding, each furnace will have a daily rated capacity of 1508 tons.

International Harvester To Build Plant in Mexico

International Harvester Co., Chicago, will build a farm machinery plant at Saltillo, Coahuila, Mexico.

In the initial stage, the plant will be primarily for assembly of farm machines used by Mexican farmers. Some of the parts will be shipped to the plant from American factories, and other important components will be manufactured in the Mexican plant.



NEW TECHNICAL CENTER: Scale model of General Motors' scientific and engineering workshop of tomorrow is inspected by GM executives. Left to right are: W. J. Davidson, executive engineer; C. L. McCuen, vice president in charge of engineering; Charles F. Kettering, vice president and director of research; Harley J. Earl, vice president in charge of styling

For additional details see page 64

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Schaible Foundry Co., Cincinnati, has acquired a site adjoining present holdings, from American Compressed Steel Corp., for which is planned a modern foundry structure with 20,000 square feet of floor space.

—o—

American Can Co., New York, has awarded Turner Construction Co., New York, contract for a $400,000 warehouse in Tampa, Fla.

—o—

Communications Measurement Laboratory, agent for Defense Supply Corp., has acquired 20,000 square feet in the former Central Foundry building, Dundalk, Md. A third of the space has been equipped for manufacturing, and the rest is for storage. The laboratory is to repair or modify electronic equipment of the armed forces.

—o—

Joseph Rothstein, Baltimore, manufacturer of marine hardware, has increased production facilities.

—o—

Bendix Radio Division of Bendix Aviation Corp., Baltimore, has appointed D'Elia Electric Co., Bridgeport, Conn., distributor for its forthcoming line of Bendix radios and radio-phonograph combinations.

—o—

Westinghouse Electric Corp. of East Pittsburgh, Pa., has formed an avia-

tion gas turbine division for manufacture of military and, later, commercial gas turbine aircraft engines, based on the jet engine. Headquarters of the new division will be at the Westinghouse works at South Philadelphia, Pa.

—o—

Homer Tool & Mfg. Co., Newark 5, N. J., has moved to 45-49 McWhorter street.

—o—

General Electric X-Ray Corp., Chicago, is moving its main offices from its plant at 2012 Jackson boulevard to the Insurance Exchange building, 175 Jackson boulevard.

—o—

American Can Co., New York, is establishing a new branch laboratory at Los Angeles to serve the packing and canning industry of southern California.

—o—

Pittsburgh Steamship Co., Cleveland, has sold the steamers MAUNALOA and DOUGLAS HOUGHTON, and the barges ROEBLING and FRITZ, to the Upper Lakes & St. Lawrence Transportation Co. Ltd., Toronto, Canada.

—o—

C. L. Gougler Machine Co., Kent, O., has purchased the Miller Keyless Lock Co., also of Kent. The latter will be operated as Keyless Lock Division of the Gougler company.

—o—

Tyson Bearing Corp., Massillon, O., has appointed Borg-Warner International Corp., Chicago, as its sales representative in all export markets except Canada and Alaska.

—o—

Paisley Products Inc., Chicago, is enlarging and modernizing its factory.

—o—

Lakeside Foundry Service Co., 39 South LaSalle street, Chicago, has been appointed exclusive distributor in Illinois and Indiana for E. J. Woodison Co., Detroit, manufacturer of foundry supplies.

—o—

Winona Tool Mfg. Co., Winona, Minn., has been purchased from C. N. and Frank G. Dean by Harry J. Busdicker and Elmer A. Fuklie.

—o—

Menasco Mfg. Co., Burbank, Calif., has purchased the Malabar Machine Co., Los Angeles, makers of hydraulic jacks. E. P. Grime, hydraulic equipment designer, and Howard Hutchins, Malabar manager, will continue in their positions.

—o—

International Detrola Corp., Detroit, announced that a proposal to merge Utah Radio Products Co., Chicago, and Universal Cooler Corp., Marion, O., into International Detrola has been approved by directors of all three firms.

—o—

North American Phillips Co. Inc., New York, reports that about 30 per cent of the buildings of its plants in Holland were badly damaged or destroyed by Royal Air Force bombings in 1942 and 1943 and by German bombings in 1944.

—o—

Walker-Jimieson Inc., 311 South Western Avenue, Chicago 12, radio and electronic distributor, has published a series of brochures listing various types of industrial equipment available for improving production, inspection and research facilities.

STEEL Index Ready

The index to Volume 116, STEEL, *for the first six months of* 1945, *is ready for distribution. Copies will be sent to all subscribers requesting them.*

Republic Steel Reports Increase in Net Income

Republic Steel Corp., Cleveland, reports consolidated net income for the second quarter of 1945 of $3,271,703 after all charges, including estimated federal income and excess profits taxes. A provision for federal income and excess profits taxes of $10,550,000 was made for the quarter. Second quarter earnings exceed those of corresponding period of last year by $1,213,049.

Earnings for the first half of 1945 total $6,356,251, compared with $4,275,265 for the first half of 1944.

Net Sales of Lukens Steel And Subsidiaries Decline

Net sales of Lukens Steel Co., Coatesville, Pa., and subsidiaries, By-Products Steel Corp. and Lukenweld Inc., for the first three quarters, ended June 16, of their present fiscal year amounted to $33,233,994.95, compared with $36,664,462.39 in the corresponding period a year ago.

Unaudited net income from operations for the first three quarters of the firms' present fiscal year was $40,968.01, after provision for federal and state taxes. This does not include the estimated federal tax recovery due to carryback provisions of the Internal Revenue Act amounting to $366,600, which results in a total net income of $407,568.01 from all sources. Net income of the corresponding period a year ago was $654,033.13, after federal and state taxes.

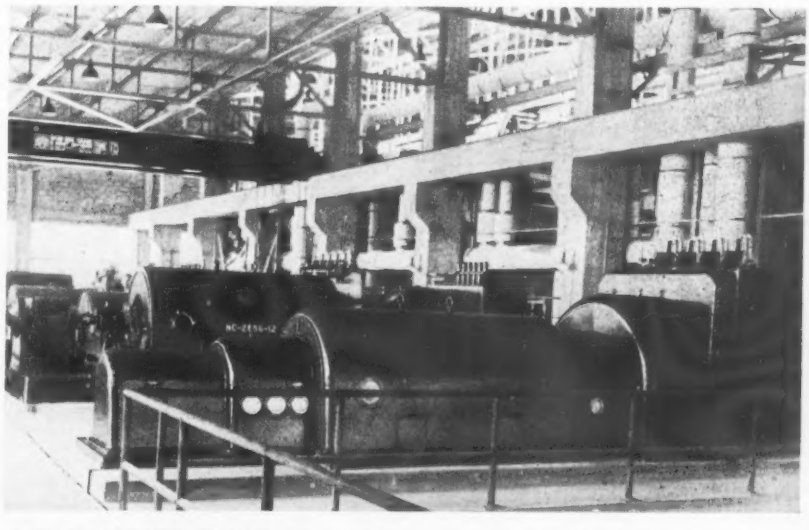
M. A. Hanna Co. Reports Increase in Net Profit

M. A. Hanna Co., Cleveland, reports consolidated net profit of $1,999,053 for the first half of 1945, after all charges and taxes compared with $1,868,761 in the corresponding period last year.

Net profit for the three months ended June 30, 1945 amounted to $1,152,056 after all charges, compared with $1,025,348 in the corresponding period of 1944.

Copperweld Steel Co. Has Increased Net Income

Copperweld Steel Co., Glassport, Pa., reports net income for the first half of 1945 of $475,959, after provision for federal and state taxes, compared with $298,060 for the corresponding period of 1944 which included $248,460 excess profits tax recoverable from 1942.



CUBAN POWER PLANT: Out of the wartime development of a huge new industry has come the second largest power plant in Cuba at the Freeport Sulphur Co.'s Nicaro nickel project at Nicaro. Shown here is a view of the turbine floor

HYDRAULIC

Small hydraulic presses adapted to stamping show outstanding production record, yet total cost installed is only about one-third that of conventional mechanical presses to do same work. Quietness, safety, simplicity, small space requirements, low maintenance costs also reported

By G. W. BIRDSALL
Associate Editor, STEEL

ADAPTATION of small self-contained hydraulic presses at Ypsilanti Machine & Tool Co. for use in high-speed blanking of silicon steel laminations for electric generator pole pieces may mark a significant trend toward the greater use of hydraulically powered and controlled equipment in metalworking plants.

More and more fields formerly held exclusively by mechanically actuated units are being invaded by hydraulically powered and controlled equipment. Large hydraulic presses have been developed for production of extremely heavy forgings, work formerly done almost exclusively by steam hammers. Too, the number of machine tools employing hydraulic power is increasing rapidly. And the advent of small self-contained bench-type units such as the Denison "Multipress", Figs. 2, 4 and 6, is bringing hydraulic power into a large number of other plants for the first time.

Like other hydraulic equipment, the Multipress features amazingly smooth operation, coupled with unusual ease and simplicity of control. Ram pressures are controllable from 300 to 8,000 pounds; stroke is adjustable from 1/32 to 6 in.; ram speeds from 20 to 200 in. per minute. Simple controls provide a wide range of manual and automatic cycles of operation. This combination adds up to make an extremely versatile unit already found useful for making press and force fits as well as riveting, crimping and similar joining operations; for such machin

Fig. 1—Closeup of special enclosed die used in 25-ton hydraulic press for simultaneously upsetting the heads four rivets that hold together a group of lamination forming a pole piece for an electric motor or generator. Wide range in size and design is handled

Fig. 2—Portion of production line at Ypsilanti Machine & Tool Co., Ypsilanti, Mich., with three Denison Multipress units blanking electric sheet steel. Table in foreground is used for collating stacks of stamped laminations

Fig. 3—Precision scale is employed to sort out number of laminations required to make up a pole piece. Photos by Birdsall

Fig. 4—Small bench-type hydraulic press recycles automatically to blank out silicon steel laminations for motor and generator cores. Dies are totally enclosed type; special fitting on bottom of ram permitting quick change

Fig. 5—Large hydraulic unit is employed alongside assembly bench to rivet group of laminations together to form a pole piece

PRESS STAMPING

work as broaching, shearing and cutting; for fatigue and hardness testing; for briquetting, extruding, peening, forging; also a wide range of sheet metal work including blanking, punching, forming, flanging and similar operations.

High-Speed Blanking: Preston Tucker, Ypsilanti Machine & Tool Co., Ypsilanti, Mich., reports extremely satisfactory results from their conversion of standard 4-ton Multipresses to 6-ton units for high-speed blanking of silicon steel laminations in production of laminated pole pieces for electric motors and generators.

These laminations are blanked out by ...ile thousand from high-quality electric steel. For many parts, this material is ...eived from the mill in 8-ft. lengths, ...n. wide, the stock being 0.018-in. thick. ...er on it will be possible to obtain this ...ge of steel in coils, at which time ...tomatic press feeds will be installed.

Dies are set up to allow operation of the ram bar near the top of its stroke as

only about ⅛-in. of the 6 in. available is utilized in blanking operations. By confining the movement to the upper portion of the stroke, the ram is guided much more firmly because of the two-point support given it by the piston at top and by the ram seal and guide at the bottom of the hydraulic cylinder. This in turn contributes to a more accurate alignment of dies.

As seen in Fig. 4 the dies are of the enclosed type. Mr. H. H. Smith, superintendent of the Ypsilanti plant, recommends that dies with four posts or guides be utilized to offset any possible wear of dies or ram bearings. Dies for blanking must of necessity operate with closely controlled clearances if amount of "burr" or coining action at the cut edge is to be held to a minimum.

With a ⅛-in. stroke, the machine operates at rate of 500 strokes per minute, the controls being set to automatically recycle as long as the foot pedal is depressed. However, to get longer die life, Mr. Smith reports they hold down press speed to 135 strokes per minute. Even at that lower speed, from 35,000 to 55,000 laminations are blanked on each press per shift.

As in many other press operations, it is necessary to have good dies to get maximum precision and production. Die life is as high as 148,000 pieces between grinds, although the average is around 90,000 to 100,000 pieces per grind.

Operations At Ypsilanti: As seen in Fig. 2, the setup at Ypsilanti Machine & Tool Co. employs three units which have been converted from standard 4-ton Multipresses as will be explained. The strip stock is received in bundles. From storage back of the presses in Fig. 2, the strip is placed on a feeding table immediately adjoining the presses. Here the stock is oiled prior to blanking operation.

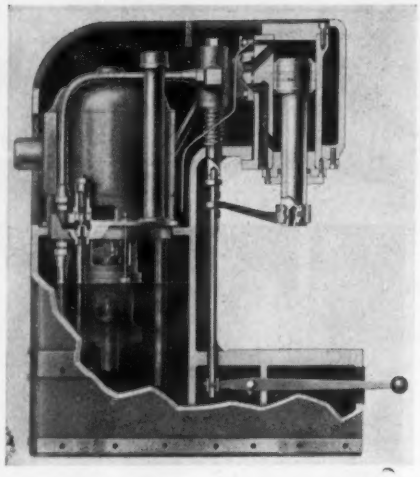


Fig. 6—Cross-section through standard Multipress revealing complete self-contained hydraulic system

Strip is fed into the enclosed dies against a positive stop which is operated by ram movement to permit feeding the stock forward at each stroke of the press. Laminations are stacked automatically in a chute as they come from the dies. Then workers line them up on a wire or rod with all the burrs in the same direction. Even with sharp dies, some burr is produced and keeping them in the same direction in the stack avoids any possible difficulties in making a tight assembly.

After washing in an Oakite solution and rinsing, the laminations are weighed out on a Shadowgraph, a highly sensitive scale shown in Fig. 3. Correct number of laminations to give the desired stack height is determined here instead of counting them piece by piece. Laminations then are riveted together in the larger 25-ton Denison hydraulic press shown in Figs. 1 and 5.

This larger press is adjustable through a range of pressures from 5 to 25 tons, has an 18-in. maximum stroke, uses a 20-hp motor. It is also used for blanking, easily handling considerably heavier stock than the small Multipress units. A typical job will consist in blanking laminations for a motor pole piece from 0.062-in. cold-rolled steel, from strips 8 ft. long, 3 in. wide, at rate of 25,000 to 30,000 per shift.

Three Presses For One: The low cost of the Multipress is important to a small plant as it means the entire three units used here cost less than a single standard mechanical press to do similar work. In addition, a number of other important advantages are obtained that are significant.

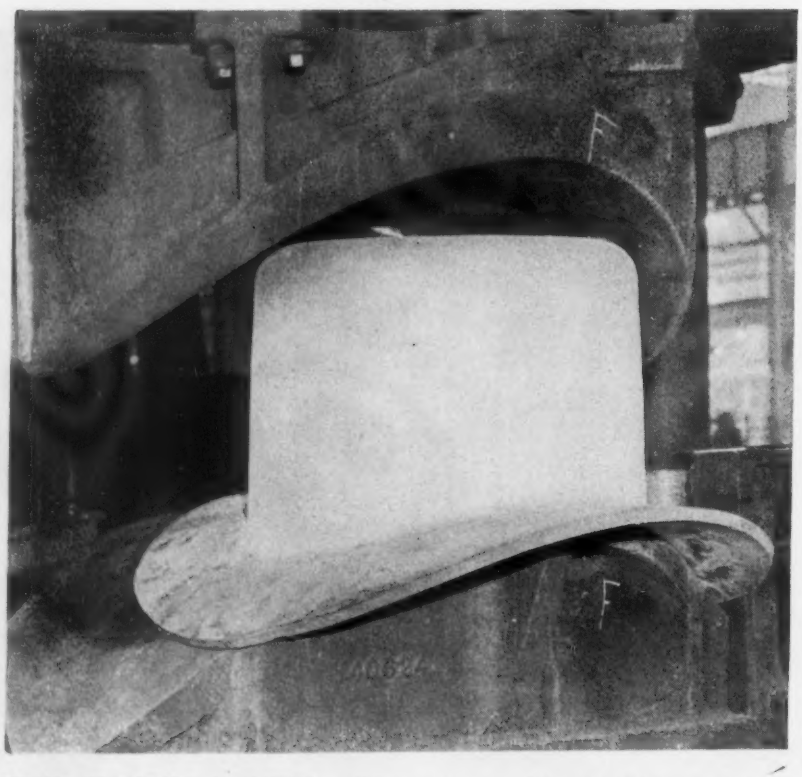
No special safety devices or guards are necessary, because there are no exposed moving parts. The only thing that moves under power is the ram. The upper die is entirely enclosed so there is no hazard to the operator whatever.

Low Maintenance: The lack of mechanical wear also contributes to savings, for it means that maintenance costs are exceptionally low. The parts moving under power in these units are the ram and the pump rotor with its drive, both of which are flood-lubricated by the hydraulic oil medium that transmits the power from the pump to the ram. Control elements are extremely simple, consisting of a single pressure relief valve for adjusting the maximum pressure to the value wanted, and an automatic 4-way valve for controlling ram motion.

Construction: Referring to cross-section, Fig. 6, note that the arrangement of elements is extremely simple. The lower part of the press frame acts as a reservoir to hold the hydraulic fluid (oil). The pump is mounted so it is submerged in the oil. Above the pump and connected to it by a flexible coupling is the electric motor.

Pump delivers oil through the 4-way valve to either top or bottom of the double-acting cylinder containing the one-piece ram and piston. Steel piston rings form the piston-to-cylinder seal. V-ring type leather packing in an ample bronze sealing gland seals the opening at the lower end of the cylinder. Ram works over a U-shaped opening 4 in. wide and 7½ in. deep in the base which

(*Please turn to Page* 122)



"HAT" BLOCKED IN STEEL: Formed from a flat metal slab on a large forming press, this white-hot locomotive boiler dome is 24 in. high and 33 in. in diameter. The dome, along with other parts for lend-lease locomotives, is turned out by Eddystone, Pa. plant of Baldwin Locomotive Works

Arc Welded Fabrication

Permits improved design, speedy construction of railroad flat cars with 10 per cent time-saving over conventional method

SPEEDY, efficient fabrication of railroad flat cars made possible by shielded arc methods of welding has effected important economies in the construction of vital equipment at shops such as those of the Pennsylvania Railroad at Altoona, Pa.

With careful attention to load requirements and other design characteristics, this type of heavy construction offers no more of a problem than many other similar items of essential railroad equipment, according to Lincoln Electric Co., Cleveland. It is important to note, however, that in the various phases of fabrication shown in accompanying illustrations, it is evident that welding methods were applied to obtain a sturdy, durable structure of minimum weight which required the least amount of critical materials and man-hours of construction time. In addition to the time-saving, the cars are said to be sturdier.

The car's center and side sills, shown at top, are illustrative of the simplicity of welded subassembly throughout. The various heavy members were positioned and arc welded with 5/16-in. diameter rods into integral units with fillet type joints predominating. Smaller parts of these structures were positioned in jigs for most effective welding speed and ease of application. Electrodes were of the American Welding Society E-6020 type for deep groove welding of mild steel, applied in three passes. The 15-ton center sill and the side sill are both 48 ft 3 in. in length.

Assemblage of sills and supporting members of the bed framework are being tack welded in second panel, with work done in flat position as shown with 5/32-in. electrodes of the AWS E-6012 specification. Standard butt and fillet-type welds are made in two passes for finish welding with ¼-in. rod being used on the heavier members.

To obtain the most efficient welding of certain cross member joints, the frame is turned on its side as illustrated. A simple jig with cable supports holds the work upright. Beads are laid horizontally at the joints in three passes.

Completion of the job (fourth panel), requires turning of the structure in an upside-down position. Here, flat fillet and vertical welds are made on main pieces as well as couplers and brake rigging.

The completed car, weighing 96,300 pounds, is shown in Fig. 5. Only three welding operators were required for the job and a time saving of at least 10 per cent for fabrication was reported over the former type of construction.

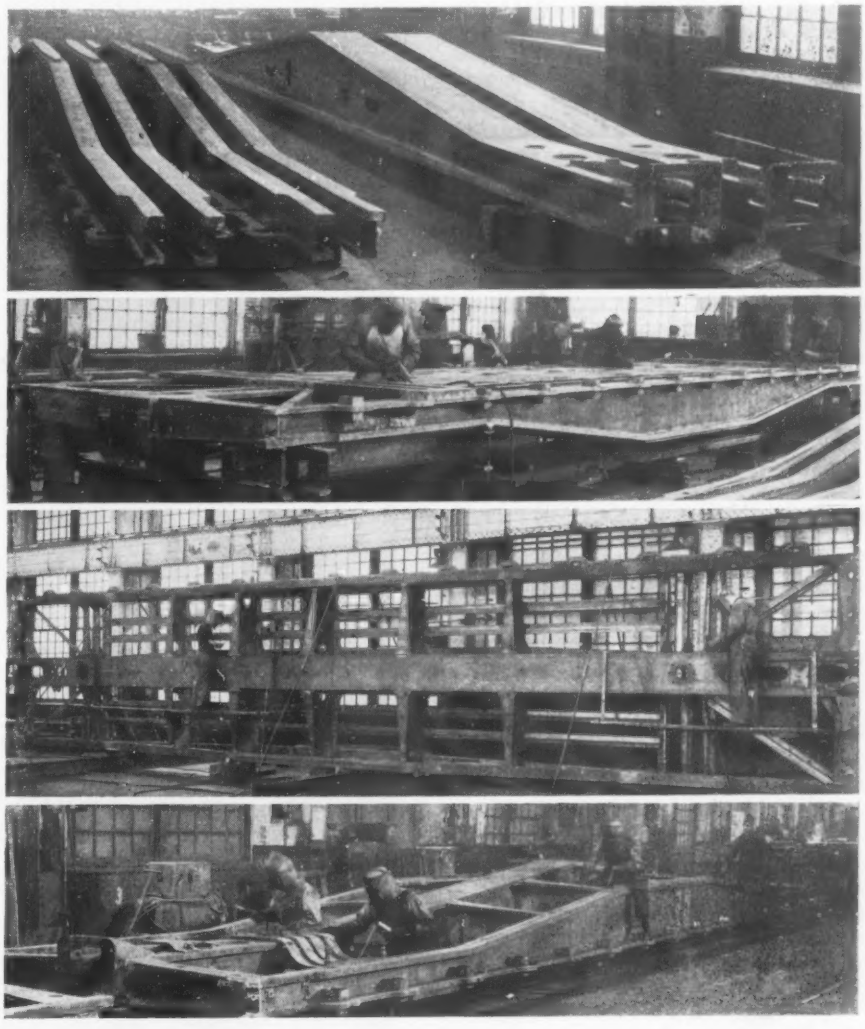


Fig. 1—Center and side sill members for welded cars

Fig. 2—Tack welding sills and supporting pieces in flat position

Fig. 3—Structure is turned on side and held in jig for horizontal welding of joints

Fig. 4—Structure is turned upside down for flat fillet and vertical welding being done here

Fig. 5—Completed all-welded railroad flat car

MODEL WAR PLANT ... pointway

DURING the war, a number of plants have been set up for making war products which are models of manufacturing efficiency and which plant management can study profitably in making plans for the reconversion of their facilities to the production of civilian products.

Degree to which automatic handling and conveying can be utilized to reduce manpower requirements and to step up efficiency generally can be realized from the fact Clayton & Lambert Mfg. Co., with two plants, for a period now measured in years has produced millions of 40 mm heat treated steel shell cases without serious break in production, on a three-shift basis, with each shift at each of the two large plants comprised of only about 700 employes, many of them women.

Installations at the plants, located at Detroit and Ashland, Ky., are equally impressive whether considered wholly in the light of their physical performance or judged only for effects on process and product of absolute mechanization. In any case, the end of war will make available for normal pursuits an unusually well planned layout of modern metalworking tools and handling equipment incorporating many new ideas.

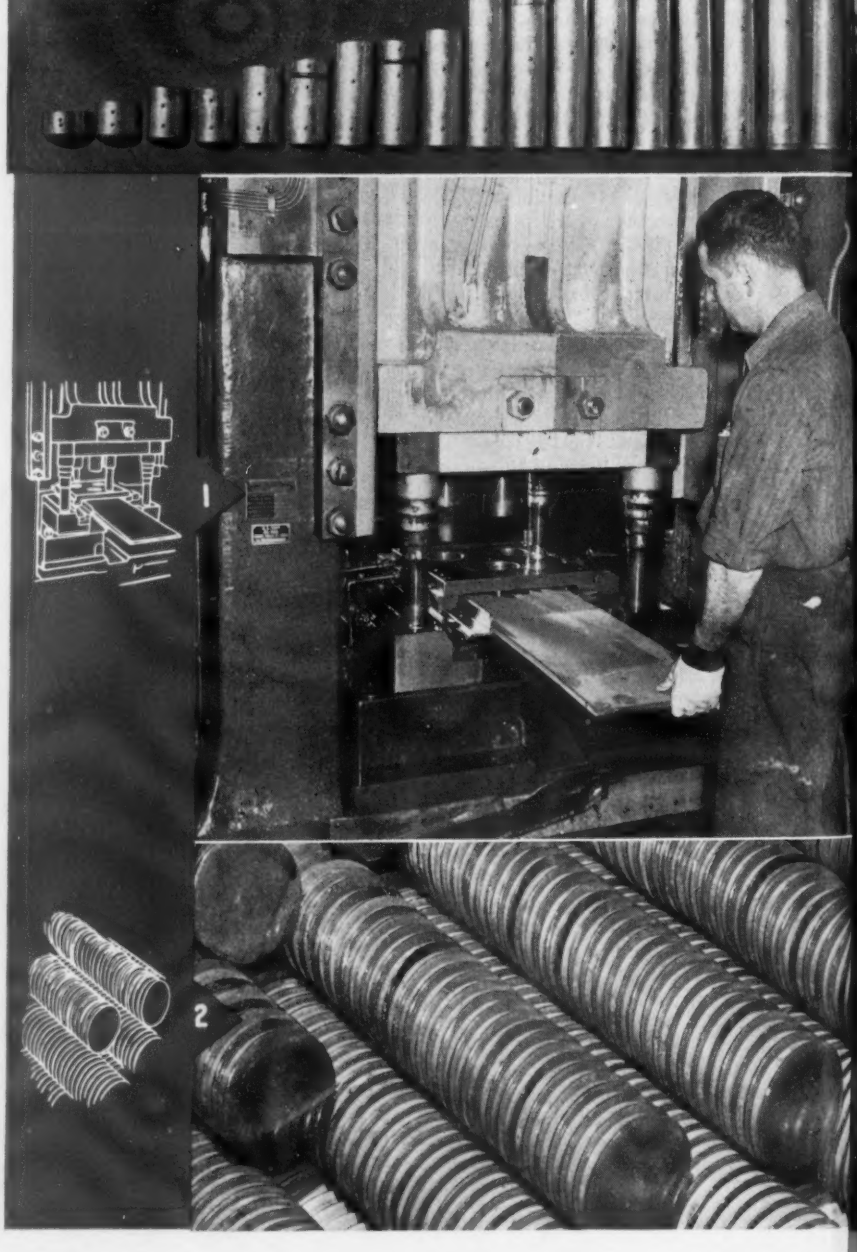
Network of Conveyor Systems

Closely tied in with stages of manufacture is a network of conveyor systems and handling devices which provide an almost effortless flow of shell cases through the various processing operations. This facility in two plants is achieved through use of 12,100 ft (nearly 2.3 miles) of overhead monorail conveyors, 6000 ft of belt conveyors, 2100 ft of chain-on-edge conveyors, and 500 ft of gravity roller conveyors. Along with this equipment, it became necessary to design and build many types of special baskets, hooks, racks, spindles and other carrying fixtures to move the product through annealing, dipping, coating and other operations, as well as between presswork and trimming. A separate department does nothing but build and service equipment of the latter type. Another maintains the zinc plating installation, racks, etc., which is believed to plate more square feet of surface daily than all job shop platers in the Detroit district combined.

An old-line manufacturer of automotive parts, Clayton & Lambert also maintains complete chemical and metallurgical laboratories at both plants. These are equipped for production control and research. In view of numerous drawing and tapering operations on the 40 mm shell cases for Bofors-type rapid-fire guns, the matter of punches and dies was a most critical one. With the exception of a few small tools containing special alloys, all punches and dies were designed by the C & L engineering department and machined and finished in its own toolroom. Likewise, all jigs and fixtures for handling, holding and processing cases were designed and built by company.

With substantial aid from the Navy Department's Bureau of Ordnance in the form of priorities and expediting delivery of presses, furnaces, conveyors and other machinery, production was started in record time.

The 40 mm case previously never had been made successfully of steel, so Clay-



ton & Lambert started from scratch in working out their process. All that was available was a series of dimensional blueprints detailing the standard type of brass case then used. Length is 12 in.; diameter at base, 2 in.; diameter at flange, 2.5 in.; diameter at mouth, 1.3 in. Sidewall thickness ranges from 0.037-in. at the mouth to 0.125-in. at the base just ahead of the radius at the flange, and 0.5-in. at the base. Cut-away exhibits on display board in first photo show sequence finally evolved.

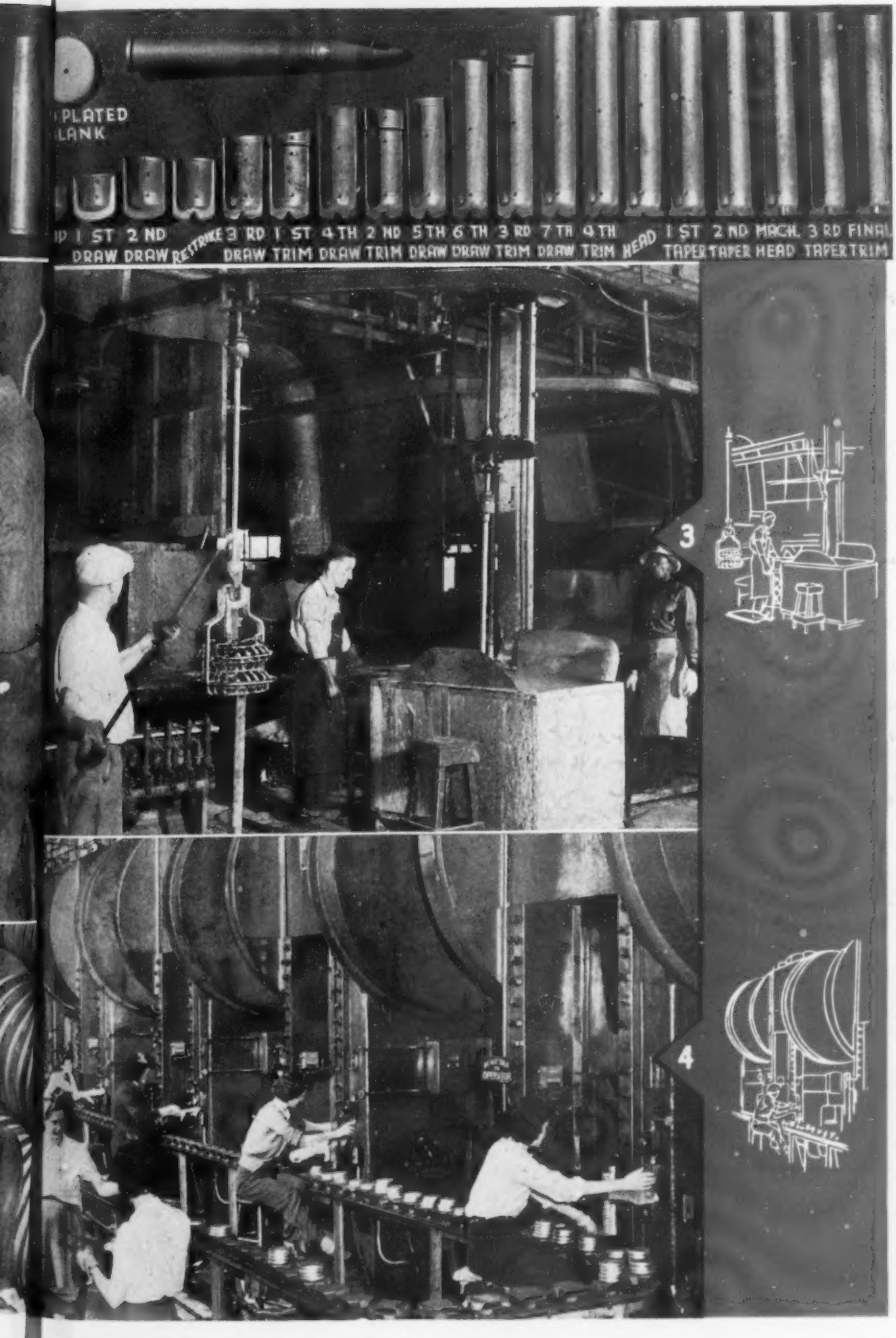
The case is the type which has a press fit primer, as against the threaded type, which facilitated manufacturing operations, since threads would have to be tapped before heat treating and then ground or polished in some way after heat treatment to insure precision. Weight of finished case is 1.82 lb.

After extensive investigation, it was determined to make the steel case from SAE 1025 steel, aluminum killed, with spheroidized anneal, 7-8 grain size, starting with 2.3 lb, 4½ in. diameter disks, blanked from ⅝-in. plate, and following through a cold-cupping operation, seven cold draws, heading and three tapers, with four intermediate annealing and trimming operations. To facilitate the cupping and drawing operations, it was decided to hot dip the steel blanks in a lead-tin alloy.

Sectioned pieces of case, mounted to demonstrate forming operations and progressive changes in contour of base and flange are illustrated on this page.

Blanking of shell case disks, three at a time, is illustrated in Fig. 1. Punches are spaced to insure maximum use of stock. Disks next are given a 100 per cent inspection for thickness, edge, and both surfaces, followed by flame cleaning to prepare surfaces for coating. Fig. 2 shows stock of 4-in. disks after being flame cleaned, but before coating with lead-tin alloy.

Originally, the pieces were lead coated before the initial cupping operation; again, following the preheading; and again, following the fifth draw. Later this practice was revised, and the third coating replaced by a dip in hot liquid soap solution. In Fig. 3 is shown automatic dipping arrangement for the lead-tin coating. This is done in immersion-heated pots. Process involves washing in continuous machines, pickling, fluxing, hot dipping, and spinning in baskets to remove excess metal. Each basket accommodates 36 disks. Carried on over head conveyor, baskets are lowered into the bath in left foreground, and vertical shaft is spun to throw off excess coating.



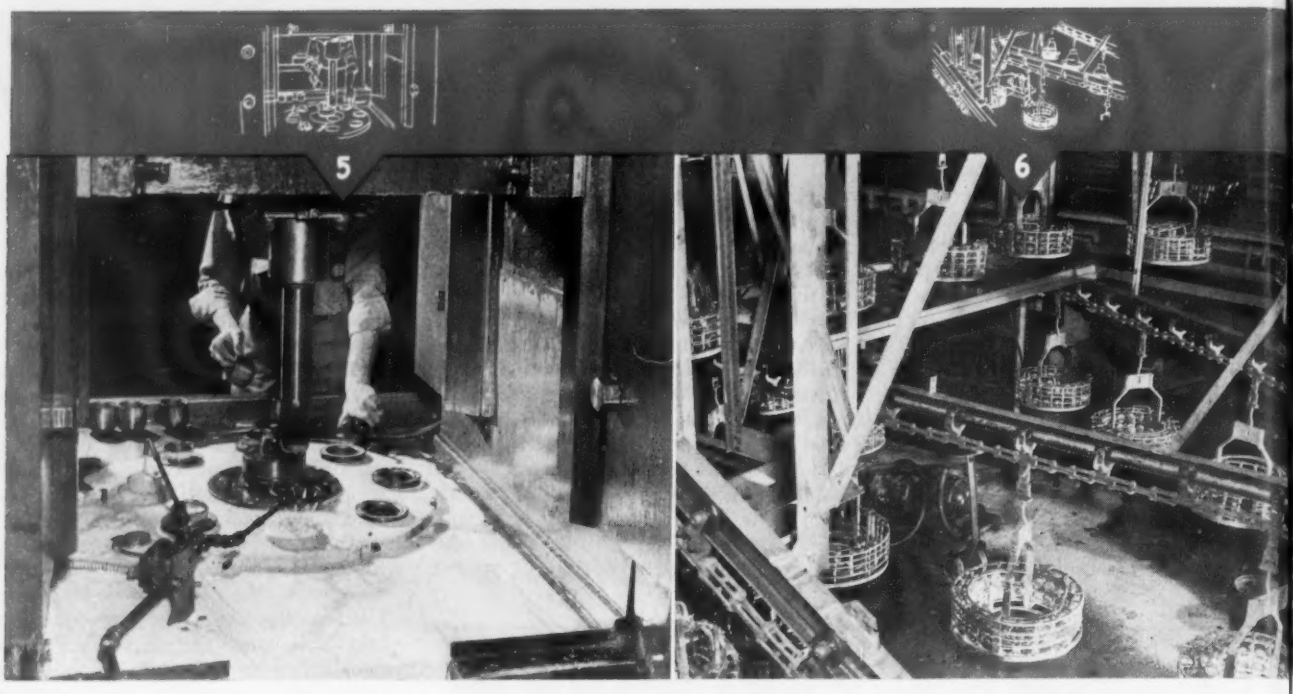
Annealing Offsets Cold Working

Coated blanks are cupped in 305-ton crank presses, ten in a battery (Fig. 4). Presses have automatic shuttle feed; all gears are enclosed and pressure lubricated.

Annealing operations are carried on after cupping (as in Fig. 4), after the second draw, after fourth draw, and after sixth draw. This means that after final drawing and tapering, cases have not developed any appreciable increase in hardness by virtue of the cold work. Process was planned this way, for it had been determined that the necessary high physical properties could be obtained only by a final heat treat under carefully controlled conditions, rather than by the effect of cold work.

First anneal of copper disks is done in roller-hearth electric furnaces provided with atmosphere control. Cups are inverted on flat steel trays so designed as to withstand heat without resort to special alloy. Furnace atmosphere is controlled to neutral or slightly reducing with cracked city gas. Separate heat zones are individually controlled and recorded by pyrometers.

First draw on cups is accomplished in 305-ton press of type shown in closeup, Fig. 5. This press, one of another battery of ten, is equipped with an 8-station Lytell dial feed. Abundance of lubricant, and special means to direct it where needed, are noteworthy. Second



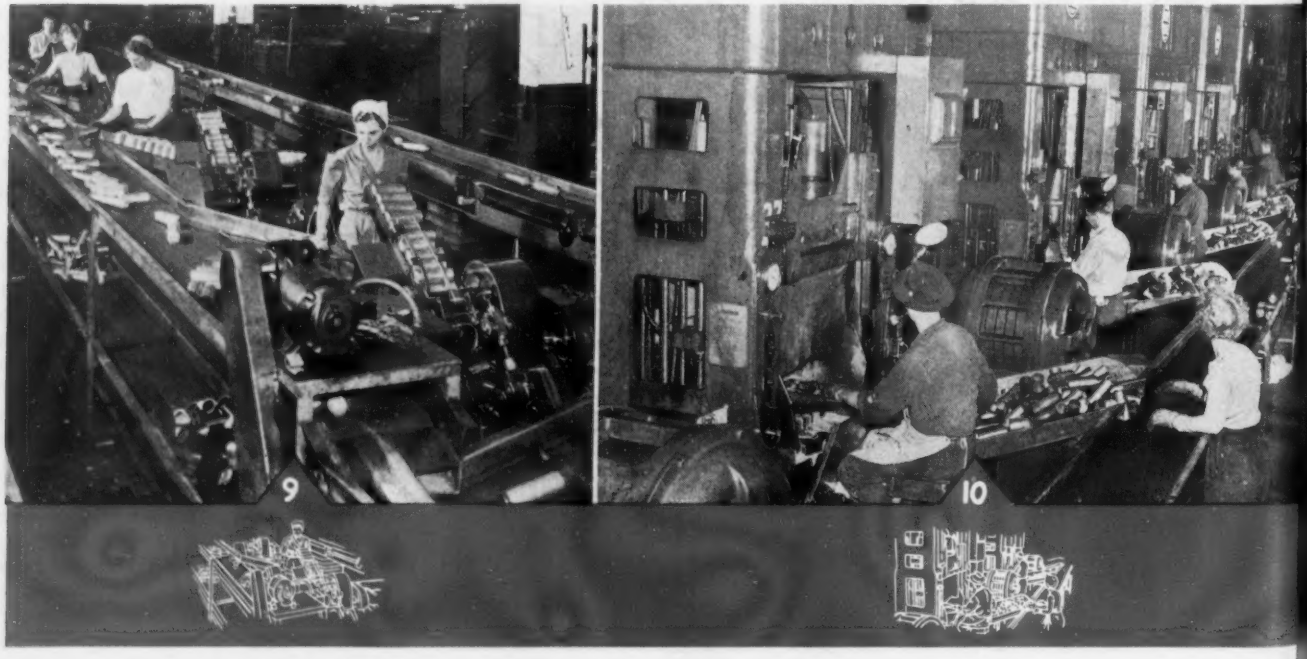
draw follows immediately, another group of presses, similarly equipped, being used for this purpose. Closed end of piece next is indented in 1000-ton knuckle-joint type presses with 8-station dial feeds, and equipped with knockout arrangement designed by Clayton & Lambert. Work then proceeds through gas-heated conveyorized washers, and onward to another roller-hearth electric furnace for the second annealing.

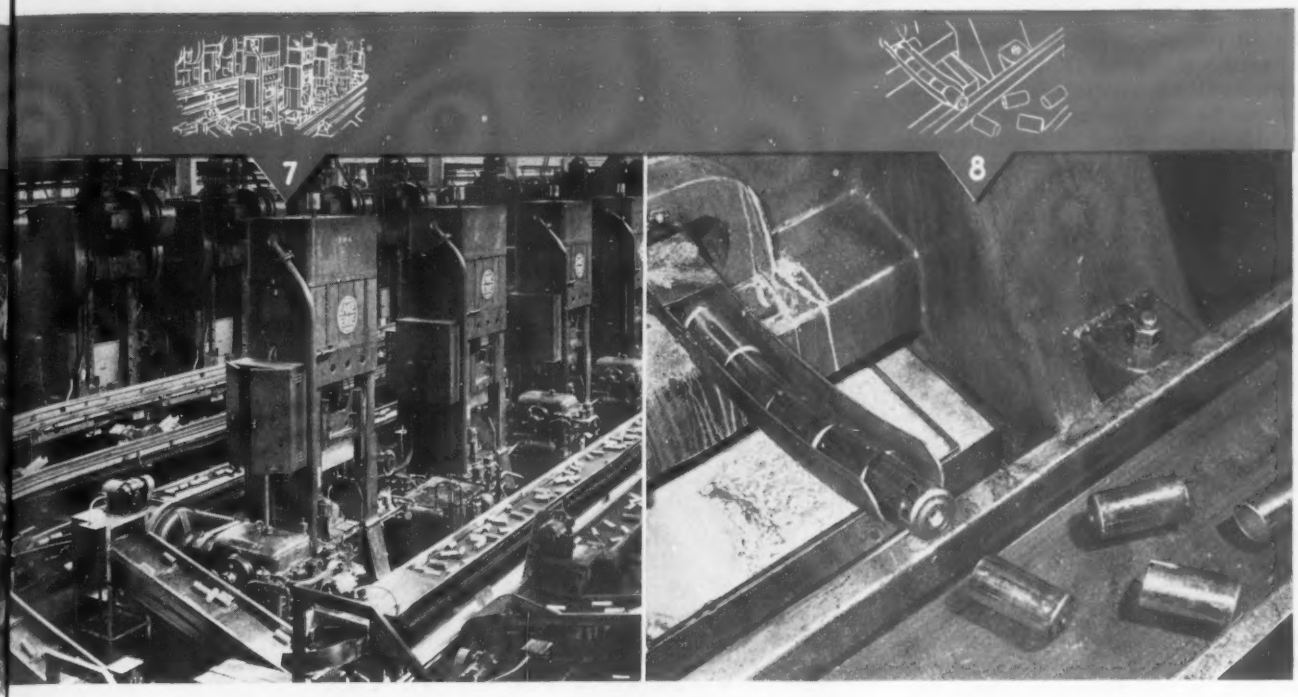
Operation 13 provides the second lead coating with pieces again in baskets for hot dipping, followed by spinning. Fig. 6 shows a maze of carriers moving pieces, like doughnuts in frying baskets, between second lead-tin coating and third press draw. Third draw is handled by another battery of ten 305-ton crank presses, also with dial feeds.

First trim takes place in a battery of 14 trimmers, specially designed for cutting wall thickness of 0.185-in. Belt conveyors in Fig. 7 move pieces along line of draw presses and trimmers. Inclined conveyors in foreground, Fig. 7, have slats to prevent partially formed cases from rolling and striking each other.

Fourth draw follows trimming, 75-ton high-speed hydraulic presses equipped with hydraulic strippers being used. There are 12 presses for this job. Cases are discharged from press, upon completion of fourth drawing operation, through a discharge chute which skids them on to belt conveyor moving toward another set of washing machines. Fig. 8 reveals this further step in elimination of manual handling. Cases again are washed, rinsed, and dried in gas heated, conveyorized washers. Operations 18 and 19, next in order, provide the third anneal —performed in electric furnaces as described in preceding paragraphs—and the second trim in a battery of eight trimmers. Belt conveyors with convenient switchoff tracks, as in Fig. 9, insure steady flow of stock to women operators of trimming machines.

Fig. 10 shows fifth draw as accomplished in 50-ton high-speed Lake Erie hydraulic presses. Note size of motors driving pumps on these presses; also feeder lines to main conveyor belt. Fol-





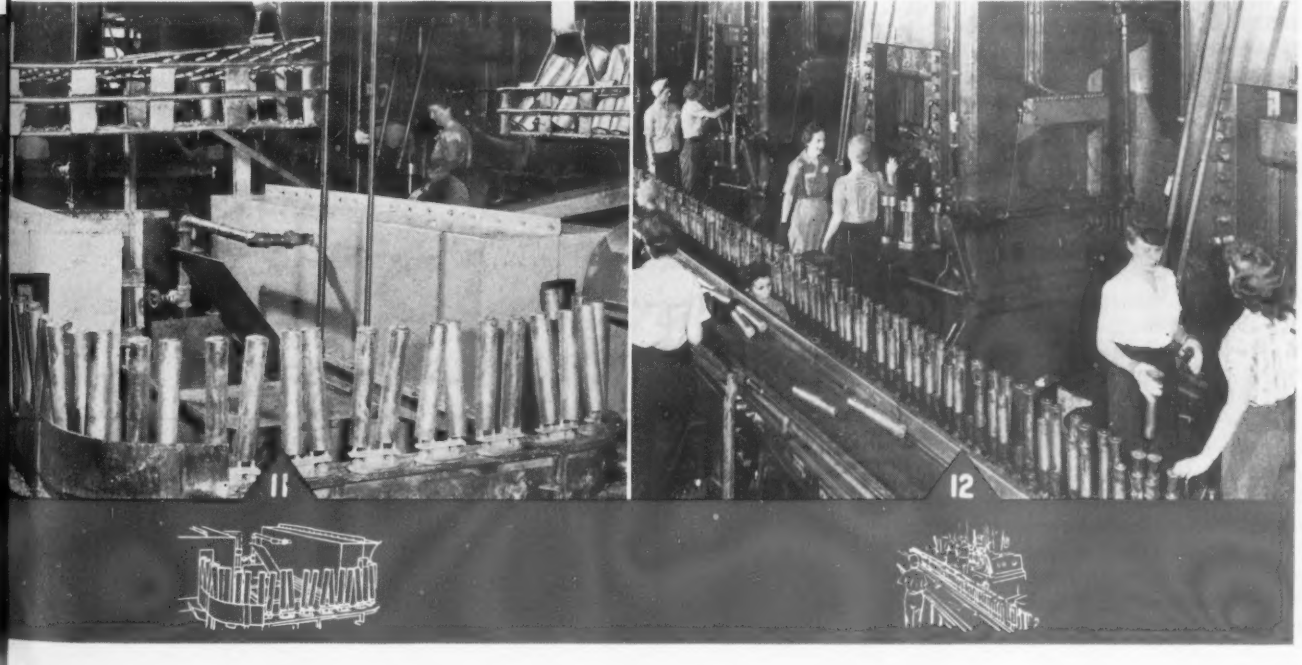
lowing fifth draw, cases are washed, rinsed and dried in other of the numerous gas-fired washing machines typified by the one in Fig. 11. These were designed by Clayton & Lambert so that the conveyor could move cases, mounted on special fixtures two to a fixture, through the slot in the cabinet.

Next, in rapid succession, comes sixth draw in 50-ton high-speed hydraulic presses, 12 in line; third trim in battery of eight trimmers; wash, rinse, and dry in two gas-heated washers; fourth anneal in roller-hearth electric furnaces; another lubrication by dipping in hot liquid soap and drying; seventh draw in 30-ton high-speed hydraulic presses, equipped with hydraulic strippers, 14 in line; fourth trim in battery of eight standard trimmers; and another wash in special C&L washers. Travel of the cases throughout is almost completely automatic.

Now looking more like shell cases, an endless row is carried on pins on conveyor chain in front of the 1200-ton, 8-station heading presses (Fig. 12). This greatly simplifies handling. The closed ends of cases are headed on eight of the knuckle-joint type presses, with special knockout and 8-station dial feeds. Tooling includes primary and secondary punches. Closeup, Fig. 13, shows these features.

Operations 32 to 37, inclusive, include application of taper compound, using two custom-built tank and conveyor units; first and second taper operations in battery of six double-crank presses, with three first and three second operations on each press; inspection for height and surface imperfections; wash, rinse and dry; machining of head in automatic chucking machines, with 33 six-station and six 5-station chucking machines employed; and finally, wash, rinse, and dry in gas-heated washers.

Heat treatment in 11 pusher-type electric furnaces follows. Fig. 14 is top view of five of the line of furnaces functioning on cases after the second taper. Charging end is at left. Atmosphere is closely controlled by electrical panels located over the furnaces and readily accessible by stairway and walkway. Fur-



naces discharge into brine quench where the 10 per cent solution is maintained at maximum of 70° F by ten 40-ton mechanical refrigeration units. In Fig. 15 may be seen conveyor-type apparatus for lifting cases out of brine quench. Brine is cooled by running through heat exchanger shown at upper right. Brine is rinsed off cases in special spray-rinse machines. The cases then are drawn in four tempering ovens at 700°F for 40 min. Special conveyor fixtures carry cases through stress relief and on through the "mouth annealing" operation to follow. Fig. 16 shows the manner of charging cases on conveyor for passage through gas-fired "mouth annealing" furnaces. This operation permits insertion of press-fit projectile and also provides for obturation in firing, thus preventing flow-back of burning powder gases. Six flame annealing units are operated.

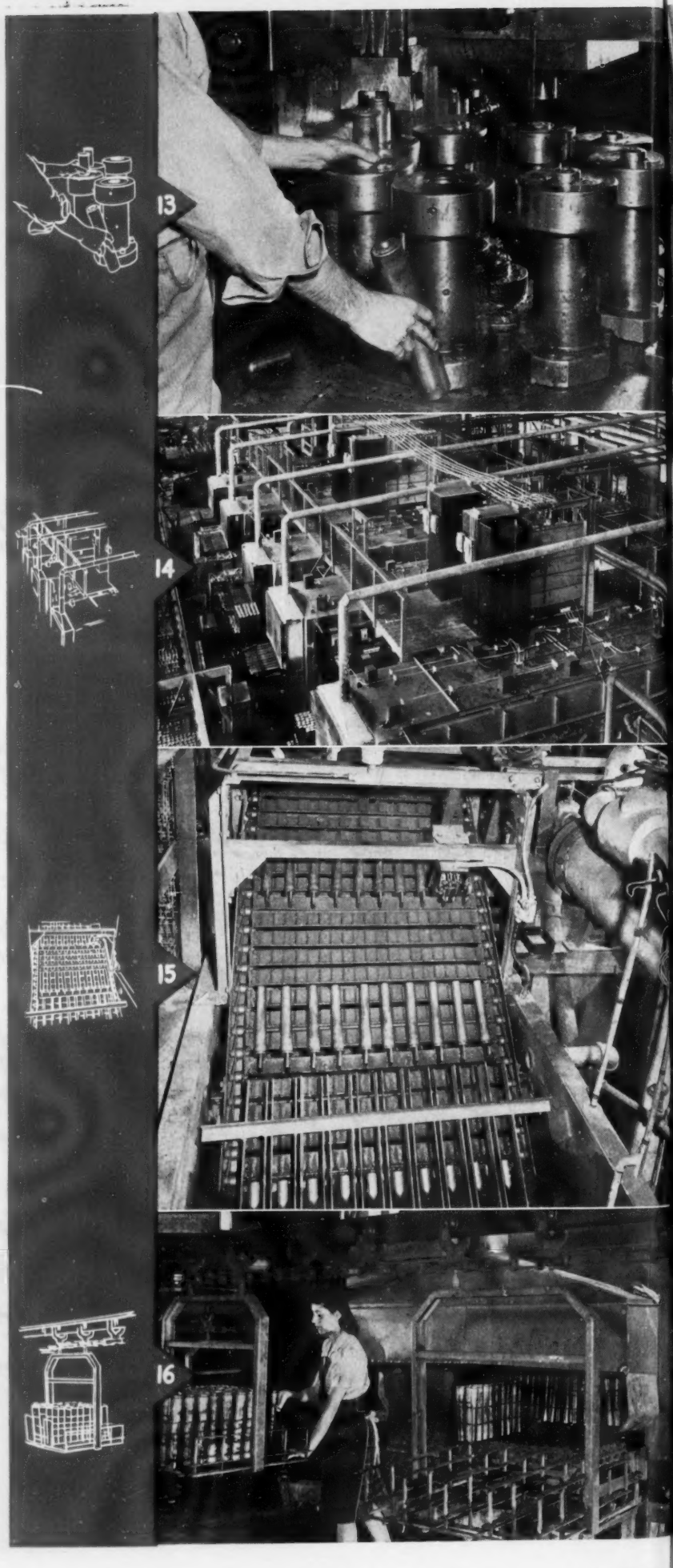
Operations 42 and 43 cover, respectively, an acid strike—pickle, wash, neutralize, rinse and dry process, in four specially built tanks; and inspection of inside and outside surfaces followed by application of final taper compound.

Operation 44, the third taper and final mouth sizing, is done on four single-action, straight-side converted double-crank presses, each performing these operations on eight pieces simultaneously. Up to this point, cases are slightly oversize and in the final press operation are stressed beyond the elastic limit of the steel, thereby overcoming any possible distortion from heat treatment.

Primer Holes Taper Reamed

Primer holes now are taper reamed in cases on 36 standard drill presses fitted with special quick-acting clamping levers to hold each case firmly for accurate finishing (Fig. 17). Final trimming in battery of eight trimmers is next (Fig. 18). Operator in foreground is using height gage. After trimming, comes another round of washing, rinsing and drying, and an operation to mark identification on head, using battery of 16 single-crank presses. A 100 per cent inspection of bare metal, inside and out, is the succeeding step. Gages used make allowance for zinc plating which follows. This inspection is made under fluorescent lights by crew of women inspectors. Defects are chalked on rejected pieces.

After the final sizing, trimming and cleaning, cases are zinc electroplated in four automatic 14-station umbrella-like machines, the largest of their type in the world. Each carrier on these machines (Fig. 19) accommodates two racks holding 72 pieces in all, making 1008 cases in process at the same time, and each time a machine indexes to the next station, 72 cases are removed and 72 others loaded. When they are taken off the electroplating machines, shell cases are carried on complementary conveyor systems through two gas heated ovens to dehydrogenize the surfaces, i.e., to avoid hydrogen embrittlement. From this point they are carried into a dichromate solution dip in similar umbrella-type ma-



chines somewhat smaller in size than the zinc plating unit (Fig. 20). The combination of zinc plating and dichromate surface treatment yields a surface which outlasts brass in salt spray tests and provides the necessary resistance to handling damage.

According to Clayton & Lambert, millions of rounds of this steel shell-case type have been fired with normal gun function, and at a cost to the Navy not out of line with brass.

Careful metallurgical control throughout the process is an essential, if specifications are to be met and rejects kept within reasonable limits. Specifications call for hardness values of 30-38 rockwell C on the sidewall. Somewhat lower values are permissible in the heavier base section, as shown in the group of six check points at which hardness readings are taken. Figures covering thousands of tests at these check points, with rockwell C values, are as follows:

Point No. 1—31 to 35; No. 2—31 to 35; No. 3—23 to 29; No. 4—20 to 30; No. 5—12 to 20; and No. 6—30 to 38, rockwell C.

Flame annealing of the mouth of the case lowers the hardness at this point to about 88 rockwell B. Physical specifications call for a minimum yield strength on the sidewall 7½ in. up from the base of 115,000 psi. Actually, yield point average is nearer 145,000 psi, with tensile strength slightly beyond this figure. Elongation is 6-8 per cent in a 2-in. test piece.

Steel Cleanliness Essential

In early experimental work with the steel case it was at once realized that one of the prime considerations for an acceptable piece was the matter of steel cleanliness. The least little trace of dirt or inclusion in the raw stock is progressively drawn out in the finished case into a streak or seam which causes rejection. The problem was put up to the main steel supplier, American Rolling Mill Co., which set about to analyze each phase of steelmaking practice and determine how a finished plate could be supplied, free from objectionable defects. Care in deoxidizing, slagging and rolling has been vital to this achievement.

Since Armco has a plant adjoining the new Ashland plant of Clayton & Lambert, the supplying of steel became a matter of moving it next door and waiting for the scrap to come back from the blanked plates and trimmers for remelting. Not only did this arrangement eliminate high transportation costs but also facilitated interchange of research and production control information, and revision of production practices to overcome defects—information which was promptly transmitted to the Detroit plant. The steel supplier also kept a crew of engineers and observers on hand at Detroit to consult on difficulties and relay their findings back to Ashland. This intimate co-operation resulted in licking many troubles before they could reach serious proportions.

What the Executive Should Know About Quality Control

Contrary to general belief, control of product quality is not confined to the inspection department but should govern the course of components from raw materials stage through to final assembly

By EUGENE CALDWELL
Consulting Management Engineer
Portland, Oreg.

PROBABLY the most intangible factor in any business is the control of product quality. Only the very large manufacturing concerns have set up the control of quality in any systematic procedure, others allowing uniformity or quality of their manufactured product to depend upon conventional inspection routines and sharp-eyed personnel.

Proper quality control does not mean that the product always will be the highest quality obtainable. Indeed, good engineering dictates specification of minimum quality and widest tolerances consistent with perfect performance of the function for which product is intended. Quality always costs money to obtain, and therefore, quality beyond that needed in any particular case always is money wasted.

For example, tolerances in the diameter of the hole in a spool of thread, as used on a sewing machine, conceivably might be held to within a millionth of an inch. But holding to this accuracy would add nothing to its usefulness over spools where the variation in hole sizes was perhaps within 1/64-in. Consequently, the extra expense of holding to such an unnecessarily close tolerance clearly would be wasted.

It is sometimes the case that more expensive raw materials are purchased, when a lower grade would serve the purpose. Often, too close specifications are set on the finished product which add nothing to the usability of the item but greatly increase its cost. Failure to observe this cardinal principle of engineering (to design a cheaper product, when that is all that is required by the service for which it is intended), is the reason a regular machinery manufacturer, such as a machine tool builder or automotive company, seldom makes a go of it in the agricultural machinery business. The machine tool builder wants to use cast steel where cast or malleable iron performs equally well; or puts a replaceable brass alloy bushing wherever a rotating shaft goes through, contrasts with the experienced farm machinery manufacturer who uses no bushing at all.

Efforts toward quality control may be classified into several different categories, as follows:

(a) Purchasing
(b) Design
(c) Manufacturing
(d) Inspection
(e) Finished Product
1. Performance
2. Appearance
3. Assembly
4. Interchangeability of Parts

Purchasing: Quality control begins with the purchasing department. The first thing to be done is to set up specifications on each item purchased. Fortunately, producers of many raw materials have set up their own specifications or tolerances, and the American Standards Association has established standards on many items. These specifications should be obtained for each item purchased, and whenever there is doubt that the specifications are being adhered to, suitable inspection procedures should be formulated. These standard specifications should be studied from the standpoint of determining if a lower grade or cheaper classification could not be used as well.

But there is always a great number of raw materials, subassemblies and the like which are special or are not covered by standard manufacturers' specifications. In these cases purchaser should carefully work up exact specifications, as they are necessary in order to obtain comparable competitive bids. All such specialty purchases are subject to variation, thus adequate inspection is requisite.

An incident which occurred several years ago in the Middle West will serve to show the importance of having exact purchasing specifications. A concern ordered a steel plate 72 x 36 x ½-in. thick and specified that "it must be perfectly flat". In due course the plate was received. Purchaser questioned the high cost of $982.74, and vendor explained that in order to make the plate "perfectly flat" they put it in planer, then in the surface grinder, and then lapped it by hand. Buyer explained that he only wanted to set a stove on top of the plate.

Design: Tendency of any design engineering department to specify higher quality or closer tolerances than necessary for the purpose stems from two sources. In the first place, most engineers who take pride in their work would rather design a high-grade mechanism than one of inferior quality, notwithstanding the fact "overengineering" is almost as impractical as not quite meeting requirements. Secondly, the engineer knows that failures in performance are more likely to be traced to his door than are high manufacturing costs. This is particularly true when something is strengthened after having given trouble; this time, the designer makes sure.

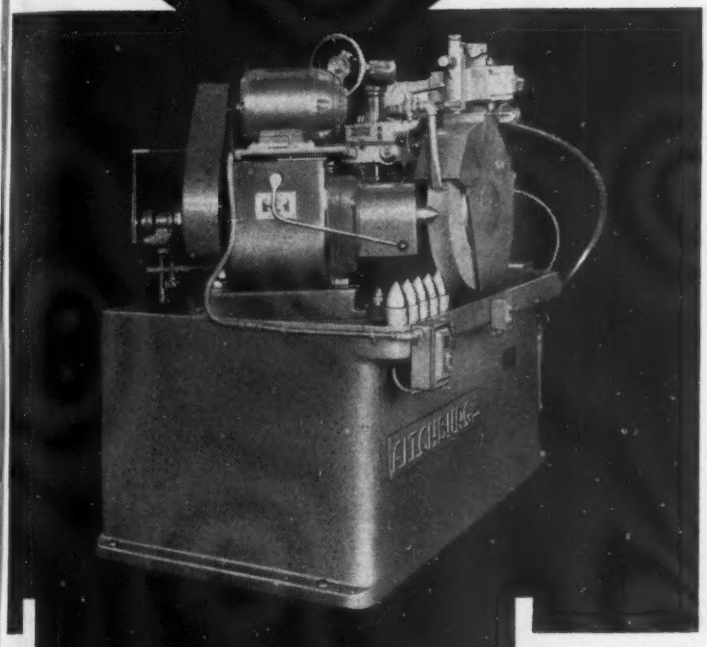
The only perfectly engineered design on record was Oliver Wendell Holmes' "Wonderful One-Hoss Shay." Here each part was designed right for the service it was to perform—not too strong and not too weak—so that each part failed at exactly the same time, when the carriage fell in a heap. Although only an American fable in rhyme, it points the ultimate goal.

Most companies have standard tolerance specifications for their drawings. For example, dimensions given in decimals are to be held to within plus or minus 0.010-in., whereas dimensions shown by common fractions are to be held only to 1/32-in. Such a standard practice saves showing many tolerances on the drawing, but the matter should be carefully checked from time to time. Since holding close tolerances always costs money, no dimension should ever be kept within plus or minus 0.010-in. if 1/16-in. difference will do no harm.

Manufacturing: Quality control is a manufacturing responsibility. The objective is to manufacture only parts that are within the specifications or tolerances.

It is far too expensive to allow manufacturing to proceed without control and

Use THE FITCHBURG BOWGAGE HEAD TO GRIND IT *Cheaper, faster, better*



Just as multiple tooling and combined cuts increased production profits of machined work in mass production, the Fitchburg method of precision grinding cuts additional cost factors from every piece, saves on production and equipment.

Designed on an entirely new principle of precision grinding, the Fitchburg head is a completely self-contained and independent grinding unit. It may be installed singly or in multiples to operate simultaneously or consecutively in mass production. It also may be installed to modernize any equipment.

Get the facts — you will instantly make a favorable comparison between Fitchburg Automatic Precision grinding and any other method. Install a Fitchburg now, and use your "Head" to cut costs and speed production. Send your blueprints for our engineers' recommendations — there's no obligation.

THE HEAD. *The Bowgage Head* is a completely independent precision grinding unit. It has rapid traverse, slow grinding feed, grinding dwell or spark out, and rapid return to starting position — all started by one push button. It is precise to .0002", minimizing spoilage. It can be removed and remounted for other work, if operations are changed.

THE BODY. *This Fitchburg Single-Head Ojive Grinder,* designed to grind the ojive of the 75 MM armor piercing shell, is typical of Fitchburg cut-cost production. The wheelhead, carrying a 24" x 3½" face wheel, is completely automatic. It is mounted with a hydraulic form trueing device to true the face of the grinding wheel at the proper radius for the nose of the shell. The workhead is equipped with a parallel-motion jaw-chuck, operated by a hydraulic cylinder at the back of the workhead.

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then expect to secure quality by rejecting in final inspection all parts that do not conform to the specifications.

Quality control certainly contemplates a broader scope than inspection. The variations beyond allowable limits of dimensions, hardness, surface smoothness, etc. are traced back to their causes such as: Drawing temperatures too cold; inexperienced operators; inaccurate machine tools; jigs improperly designed; tools allowed to become too dull, and the like. In many cases considerable detective work is required. Always, where there is difficulty in maintaining tolerances, the item should be checked back to determine if such exacting tolerances are actually needed.

Although maintaining a close tolerance is always more expensive than following a more liberal one, this does not indicate that strict quality control adds considerable cost to manufacturing. On the contrary, it has been proved in many instances that a well designed quality control program has actually reduced cost of manufacturing.

Quality control must always be a part of any time-study standardization program, particularly where wage incentives are put into effect. Where the operator is paid a premium for production, quality always suffers unless strictly controlled. Obviously, an incentive system should pay the operator only for good pieces produced.

Moreover, it is almost always necessary to set up a quality control system before time and motion studies are made and standards set. Lack of uniformity in the articles being produced may be one of the important foreign elements which cause the part to be made at one given time today and at an entirely different time tomorrow. Naturally all foreign elements must be removed before the job can be standardized as to time required for performance.

Inspection: Contrary to popular belief, quality control does not consist of more rigid inspection. Inspection is simply a means toward obtaining control of quality and acts as a check.

The inspection department is a separate function from engineering and manufacturing, and its administration should be set up entirely separate from those two departments. One writer very aptly has compared the operation of the departments of a business to the three branches of our government, each operating independently of the other and each maintaining a check on the other. The legislative branch is the design engineering department, the executive branch is the manufacturing department, and the judicial branch is the inspection department. Obviously the inspection department should not be under either design or manufacturing, because it should not be dominated by either.

The first thing to do in setting up an inspection department is to determine what inspection specifications or procedures should be written up for each item to be inspected. In writing up such procedures great care should be given to setting down for inspection only those items which really make a difference if they do not come within the tolerances specified. Otherwise many years may be taken inspecting some dimension which does not make any difference. Only after someone happens to discover it will it ever be eliminated.

This problem cannot be dismissed by stating that every dimension is important and should be inspected. Some parts are so complicated in shape that to inspect every center distance, surface dimension, fillet dimension, and the like, would take over a day of an inspector's time for one part. Obviously only those dimensions that really make a difference can be checked.

Then, too, the question must be decided as to whether each piece is to be inspected or whether random samples are to be checked. This depends upon the importance of the part and many other factors. For example if a lot of assembly labor will be spent on the part before inaccuracies are disclosed, this might justify inspection of each part. A part made on an automatic machine can more logically be inspected by sampling than a part more dependent upon the operator. The number of samples to be taken from a given lot only can be determined from what is practical in the particular case. Usually when any of the samples taken do not come within specifications, the entire lot is 100 per cent inspected.

Other types of inspection are *tool inspection* where the tools, jigs, and fixtures to make the part are determined to be accurate; *pilot piece or first and last piece inspection;* and *patrol inspection,* where the inspector goes around between operations and makes sample inspections of work in process. Final inspection may be sub-divided into two categories: *Floor inspection,* where the work is inspected at point where parts are made, and *centralized inspection* where the parts are taken to an inspection department equipped with all the necessary inspection devices.

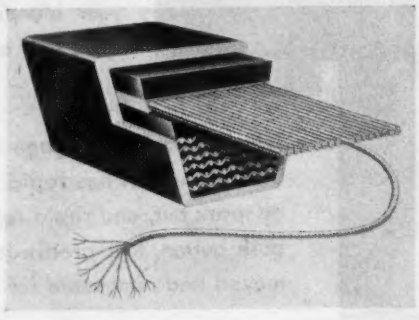
Inspection departments and quality control procedures should be laid out only by someone thoroughly familiar with modern inspection equipment. Greater advance has been made with these types of devices than in perhaps any other field. Formerly we had to depend exclusively upon micrometers, calipers, depth gages, Johanson gages, and the like, whereas now a variety of newer mechanical and electronic type inspection tools are available to supplement them. Optical comparators are used to throw an enlarged image of the part on a glass screen on which has been outlined the ideal dimensions. Photoelectric devices are adaptable to many applications. Glass gages are increasing in popularity. Each inspection problem should be properly engineered and equipment selected in keeping with the number of parts to be inspected and degree of complexity. Where the production is great enough and standard inspection equipment is not suitable, it is not too great an undertaking to design a special device to fit. In very few cases is the production so small that a simple "go" and "not go" gage cannot be justified.

Record Keeping: Keeping adequate records of inspections cannot be overemphasized. Statistics is the best approach to quality control. For example if an analysis of the inspection reports shows greater quantity of parts are rejected because they are below the tolerance limit rather than above it, this would indicate the die or tool for the part should be made larger so the average price would fall exactly in the center of the tolerance limits, thus causing less rejections. Records also show trends in quality control such as tools wearing too much, operators getting careless, improper instructions, inexperienced operators, etc. Such records should always be kept and the lot of parts so identified that responsibility for inaccuracies can be traced to a particular workman or machine. This is particularly applicable where parts are placed in stock and defects do not show up until ready for use in customers' assemblies.

Whenever quality control is considered, the question always comes up, "How much can we afford to spend on

Steel Cable V-Belts Pull Heavy Load

A steel-cable V-belt, an endless steel cable of stranded airplane-type wire, shown in cross-section in accompanying illustration, is said to replace cotton cord as the load carrying member. High power capacity of steel cables makes possible use of multi V-drives where engineering limitations formerly denied their use. They permit the pulling of heavier loads or longer life on present drives, and



enable slower speeds and designing more compact drives, often eliminating outboard bearings. The practically zero stretch of steel-cable V-belts, made by Goodyear Tire & Rubber Co., Akron 16, O., means new absolute minimum in adjustment and maintenance shutdowns. Freedom from stretch insures uniform performance. Endless V-belts are used by the army in tanks and combat cars and are said to be suited to severe industrial use.

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Pittsburgh, Pennsylvania

inspection?" The ratio of inspectors to workmen varies according to the industry and type of work involved. In a watch factory, requiring the highest accuracy and close tolerances, ratios as high as one inspector to four workmen can be found. On the other hand, a foundry, for example, might have as few inspectors as one to 50 workmen.

One rule might be that a company probably always can spend as much additional money on quality control and more inspectors as the total of present losses on spoiled work. Intangible savings from the elimination of spoiled work is exceedingly greater than the value of the spoiled work itself.

Where quantities are sufficiently large, it is possible to put inspection work on an incentive basis. If this is done, it is necessary to arrange some sort of reinspection to test the quality of the first inspection job. An example of the type of inspection work adaptable to incentives is where a number of inspectors are required to inspect large qauntities of the same item passing along a moving belt.

Finished Product Performance: Some of the inspections and efforts toward high quality will be made for the purpose of securing better performance of the finished product in the hands of the customers. The specifications to be adhered to for this purpose will be set by the design engineering department based upon research, field unit service reports, and by experimentation.

Product Appearance: Other inspections and other efforts toward high quality control will be made for the purpose of securing a better looking finished article. Sales departments in recent years have become extremely conscious of the appearance of articles to be sold, and features are written into specifications that do not add at all to the utility or durability of an article but add only to its attractiveness, thus making it easier to sell. An example of this factor is the efforts that must be made to secure a high grade paint job. Great care must be taken when working with white articles to keep finger marks off of them.

The portion of the quality specifications having to do with appearance is written by artist-engineers (such as those designers who specialize in streamlining) or at least by engineers with a high merchandising sense.

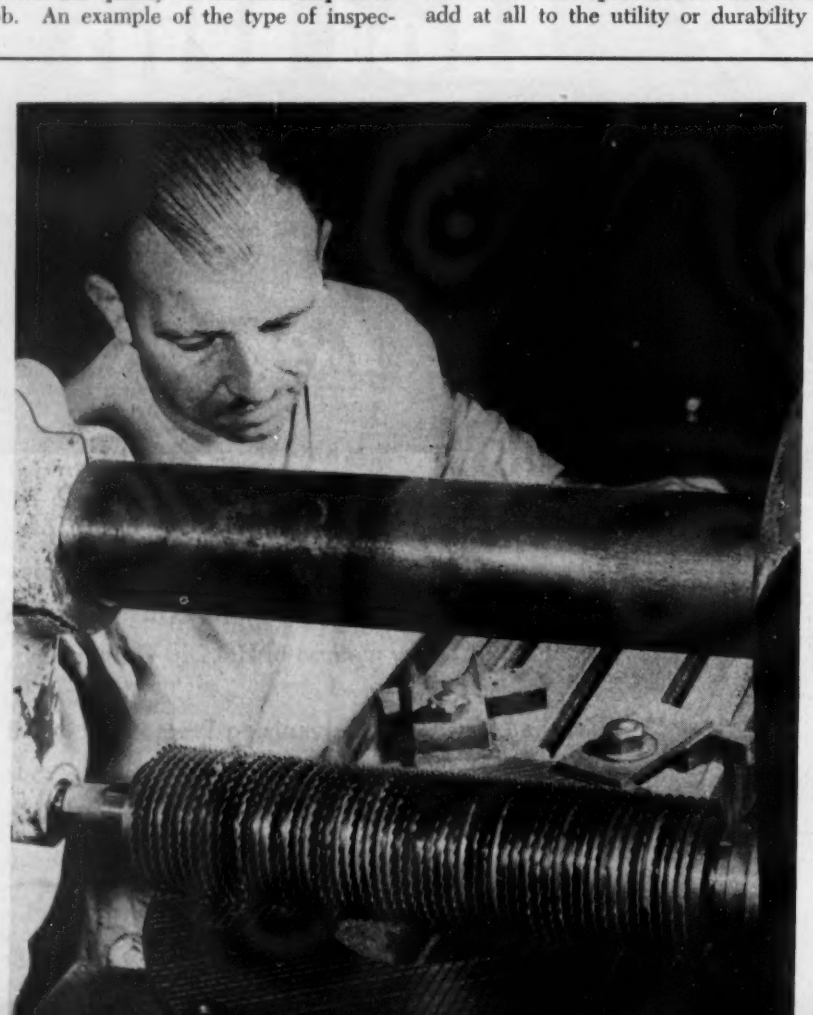
Assembly: Quality control must be maintained in most plants if for no other reason than to facilitate assembly operations. Without quality control the assembly department must file and fit, drill and tap holes after the parts get to them, and do other operations foreign to their assembly work.

Indeed, without quality control in the remainder of the plant it is impossible to iron out the foreign elements from assembly operations so they can be standardized as to methods and time with the end of putting them on an incentive basis. If parts come to assembly so that one day they go together fairly well but the next day there must be a great deal of trying and fitting, no time standards can ever be set on the operation.

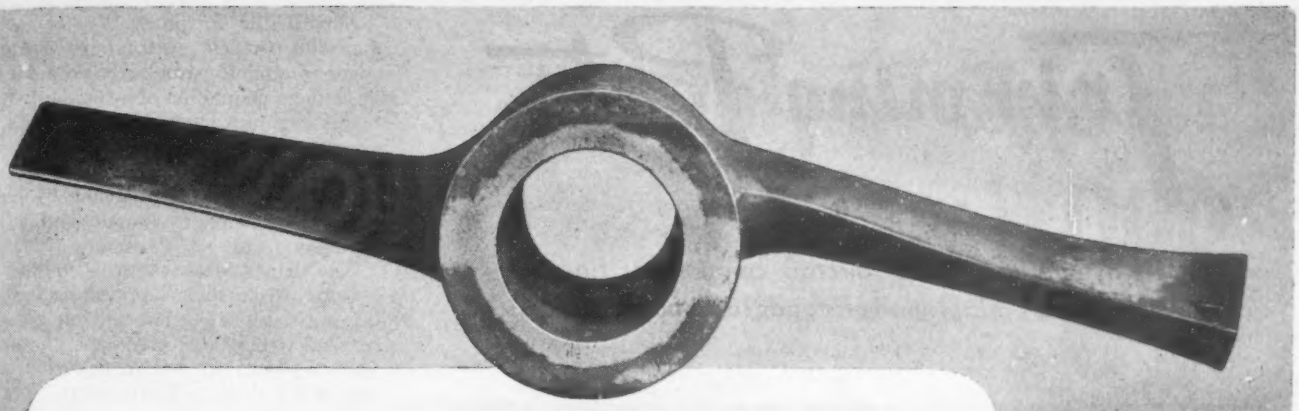
Trying and fitting will probably never be eliminated entirely from assembly operations, for where parts cost more to prepare and maintain tolerances than the cost of fitting them together in the assembly department, obviously the cheaper way will be selected. But there are very few cases of this nature, and the general rule is that greatest economy is effected when everything that can be done outside the assembly department has been done.

This phase of quality control is entirely within the scope of the manufacturing department, and this department should establish the specifications necessary to carry out satisfactory assembly. Here no specifications other than dimensional tolerances are involved, and the manufacturing department should have the authority to request closer tolerances be shown on the drawings and likewise to dictate more liberal tolerances where those shown are not necessary to effect easy assembly.

Interchangeability of Parts: Tolerances are specified in some cases for the sole purpose of making the part interchangeable with all other parts already out in the field. In other words, tolerance specified may not be necessary for purposes of assembly or for performance of the product but simply so customers can later replace the part in the field by a new one ordered from the factory. This is an important reason for maintaining quality control, for the utility of a piece of equipment has reached a low ebb when the customer must send it or a subassembly into the factory to have a new part fitted into it. Even the necessity of specifying the serial number (unless a model change has been made altering the actual dimensions) is an indication that poor quality control has been maintained.



MILLING LAPPING PLATE: To maintain peak efficiency of quartz crystal lapping plates like this one, periodic regrinding and recutting with criss-cross slots is necessary. Here an operator at the Dobbs Ferry, N. Y. plant of North American Philips Co. Inc. watches intently as the unusual milling cutter completes the final cut



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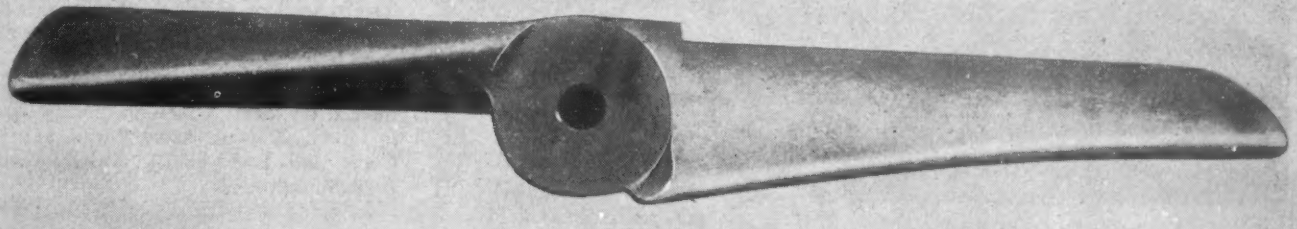

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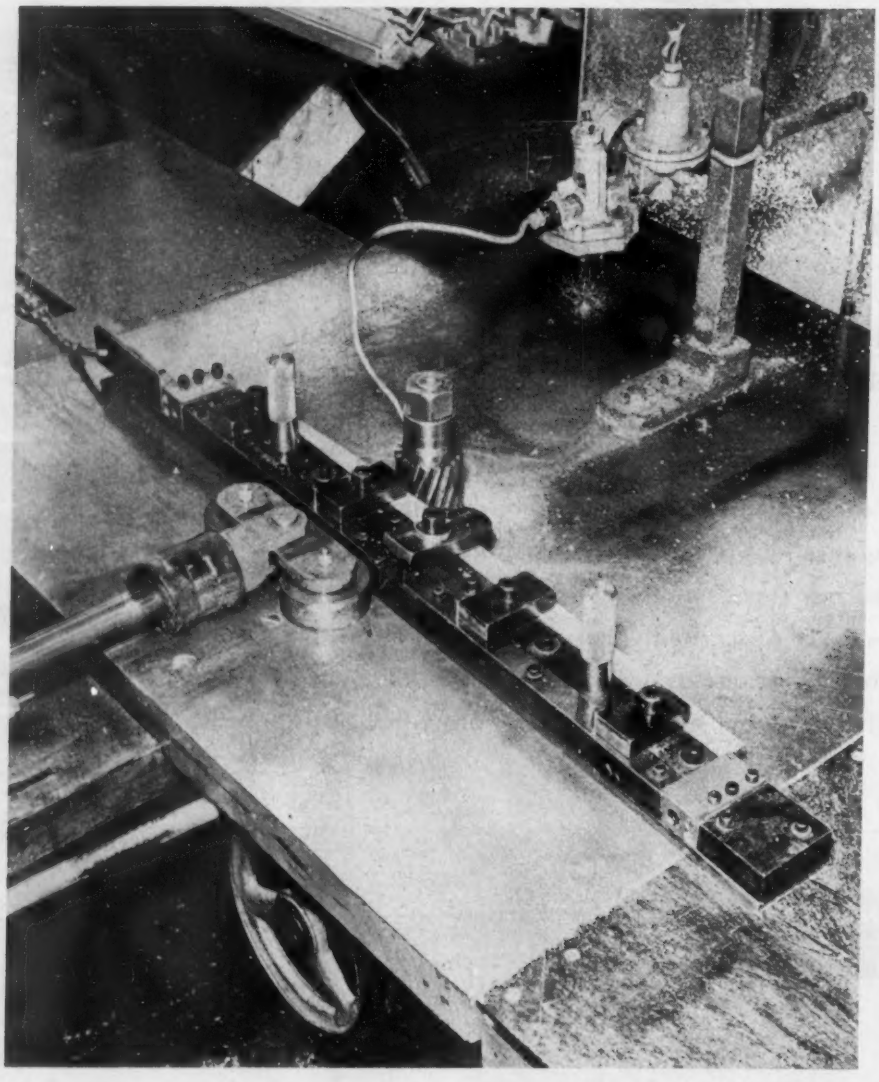
Trimming Parts

Irregular edges of aircraft components finished by adaptation of standard wood shaper



INCREASE in production of better than 500 per cent on trimming irregular edges of aircraft parts has been achieved through an adaptation of a standard wood shaper, equipped with a power feed, at Goodyear Aircraft Corp., Akron. Prior to its development, it was necessary to feed the work through the machine by hand, resulting in operator fatigue and a low production rate.

The shaper consists of a flat table with a motor driven spindle projecting through its center, on which are mounted a cutter and a collar of the same diameter. Shaper blocks are cut to the exact outline of the parts to be trimmed.

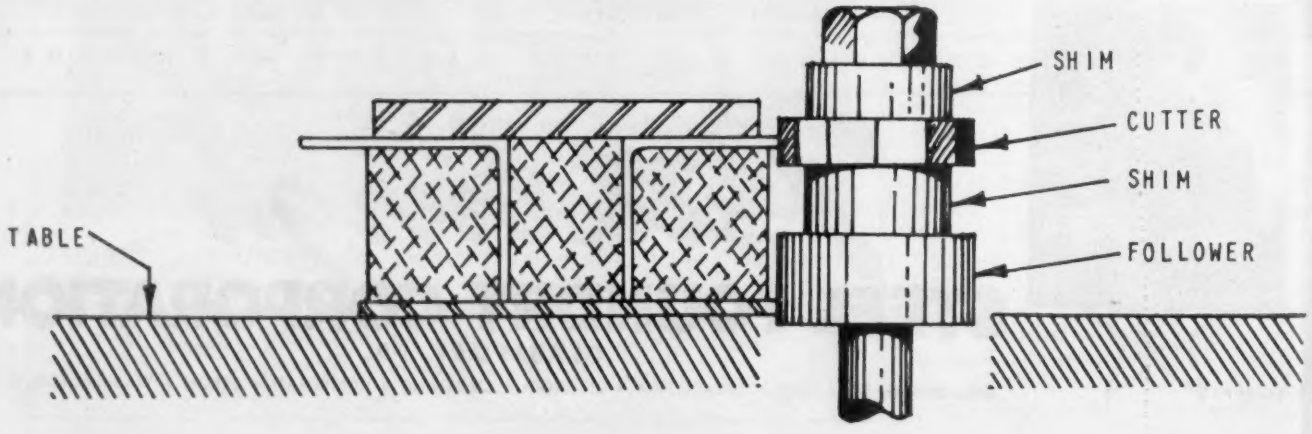
Under the supervision of C. B. Mitchella, supervisor of experimental machine and tool design at Goodyear, several attachments were installed. The power feed attachment consists of an extension to the standard shaper table. An endless roller chain is located in a groove in the top of this extension. The chain passes over sprockets at each end of the groove and returns underneath the table extension where it engages with a variable speed unit.

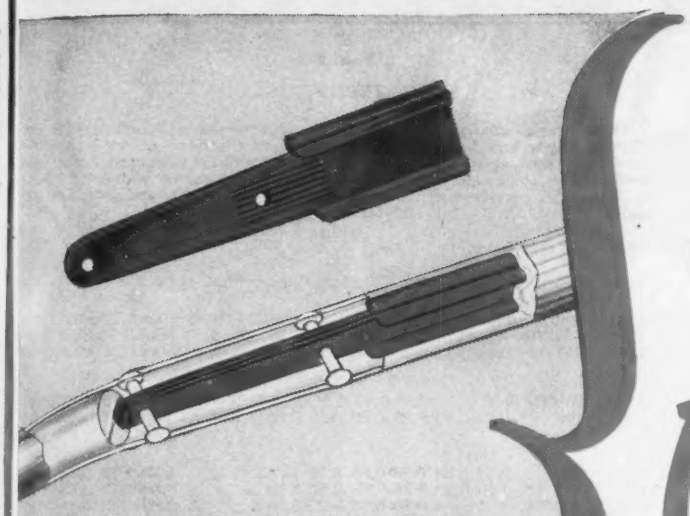
An air cylinder with a roller arrangement on the end of the piston rod is mounted on the front of the shaper table and in line with the spindle. (See photo). A chain and hook assembly is attached to one end of each shaper block. In operation the hook is engaged in the roller which pulls the shaper block by the spindle. The air cylinder is actuated and the rollers hold the shaper block against the spindle with the proper pressure, adjustable with a regulator in the air line.

The lower collar acts as a follower for the shaper block. (See sketch). Block is similar to that used on a pin router in that it is of the same size as the finished part and the part is clamped to its upper surface. On the shaper, however, it is possible to trim a stack of parts up to 1½ in. in thickness.

The shaper has been used successfully on trimming edges of extruded sections, formed sections and parts that have been formed from aluminum alloy sheet on the drop hammer or forming press.

The famous Corsair fighter plane is built at this plant, which also makes parts for about 20 other Army, Navy, Marine Corps and RAF planes, including the B-29 Superfortress.





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Closed back shovel with steel I-Beam handle reinforcement.

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The strongest yet most comfortable shovel grip made. Never checks or splits . . . no rivets to come loose.

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Both blade and socket heat treated . . . blade and frog given extra support.

CORRECTED "H" STEEL LIST

IN the July 16 issue of STEEL, 35 additional hardenability bands were shown as having approval of the Iron and Steel Committee of the War Engineering Board and the Iron and Steel Division, General Standards Committee of the Society of Automotive Engineers and the Alloy Technical Committee of the American Iron and Steel Institute.

Twenty-three of the bands shown have this approval and will be published shortly under the joint sponsorship of SAE and AISI. Bands shown for the following 13 steels are not yet finally approved and may require further slight modification prior to official publication by the two standardizing groups: 8613H, 8615H, 8617H, 8652H, 8655H, 8657H, 8660H, 8662H, 8665H, 8713H, 8715H and 8717H.

In accompanying Table I are shown the 23 additional H steels for which hardenability data now are available, plus the group of 37 H steels approved last year. Table II shows standard permissible variations in chemistry.

TABLE I

H STEEL SERIES

These steels, available in electric furnace or open hearth grades in blooms, billets and bars, may be specified on the basis of hardenability bands. Ranges and limits which follow apply only to material not exceeding 100 sq. in. in cross-sectional area, or 18 in. in width, or 7000 lb. in weight, per piece as the total product of the ingot, and excludes all plates, shapes, sheet, strip and slabs.

Steel Designation

SAE or		Chemical Composition, per cent C	Mn	Si	Ni	Cr	Mo
AISI	2512H*	0.08-0.15	0.35-0.65	0.20-0.35	4.70-5.30	Max.0.20	Max.0.06
AISI	2515H*	0.11-0.18	0.35-0.65	0.20-0.35	4.70-5.30	Max.0.20	Max.0.06
AISI	2517H*	0.16-0.21	0.35-0.65	0.20-0.35	4.70-5.30	Max.0.20	Max.0.06
AISI	3310H*	0.07-0.14	0.35-0.65	0.20-0.35	3.20-3.80	1.35-1.75	Max.0.06
AISI	3316H*	0.13-0.20	0.35-0.65	0.20-0.35	3.20-3.80	1.35-1.75	Max.0.06
AISI	4130H	0.27-0.34	0.35-0.65	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4132H	0.30-0.37	0.35-0.65	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4135H	0.32-0.39	0.60-0.95	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4137H	0.35-0.43	0.60-0.95	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4140H	0.37-0.45	0.70-1.05	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4142H	0.40-0.48	0.70-1.05	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4145H	0.42-0.50	0.70-1.05	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4147H	0.44-0.52	0.70-1.05	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4150H	0.46-0.54	0.70-1.05	0.20-0.35	.....	0.80-1.15	0.15-0.25
AISI	4317H*	0.14-0.21	0.40-0.70	0.20-0.35	1.50-2.00	0.35-0.65	0.20-0.30
AISI	4320H*	0.16-0.23	0.40-0.70	0.20-0.35	1.50-2.00	0.35-0.65	0.20-0.30
AISI	4340H	0.37-0.45	0.60-0.95	0.20-0.35	1.50-2.00	0.65-0.95	0.20-0.30
AISI	4620H	0.17-0.24	0.40-0.70	0.20-0.35	1.50-2.00	.....	0.20-0.30
AISI	4640H*	0.37-0.45	0.55-0.85	0.20-0.35	1.50-2.00	Max.0.20	0.20-0.30
AISI	4815H*	0.12-0.19	0.35-0.65	0.20-0.35	3.20-3.80	Max.0.20	0.20-0.30
AISI	4820H*	0.17-0.24	0.45-0.75	0.20-0.35	3.20-3.80	Max.0.20	0.20-0.30
NE...	8620H	0.17-0.24	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8622H	0.20-0.27	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8625H	0.22-0.29	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8627H	0.25-0.32	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8630H	0.27-0.34	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8632H	0.30-0.37	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8635H	0.32-0.39	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8637H	0.35-0.43	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8640H	0.37-0.45	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8642H	0.40-0.48	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8645H	0.42-0.50	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8647H	0.44-0.52	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8650H	0.46-0.54	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.15-0.25
NE...	8720H	0.17-0.24	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8722H	0.20-0.27	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8725H	0.22-0.29	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8727H	0.25-0.32	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8730H	0.27-0.34	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8732H	0.30-0.37	0.60-0.95	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8735H	0.32-0.39	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8737H	0.35-0.43	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8740H	0.37-0.45	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8742H	0.40-0.48	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8745H	0.42-0.50	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8747H	0.44-0.52	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	8750H	0.46-0.54	0.70-1.05	0.20-0.35	0.35-0.75	0.35-0.65	0.20-0.30
NE...	9420H*	0.17-0.24	0.80-1.15	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9422H*	0.20-0.27	0.80-1.15	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9425H*	0.22-0.29	0.80-1.15	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9427H*	0.25-0.32	0.80-1.15	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9430H*	0.27-0.34	0.85-1.25	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9432H*	0.30-0.37	0.85-1.25	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9435H*	0.32-0.39	0.85-1.25	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9437H*	0.35-0.43	0.85-1.25	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9440H*	0.37-0.45	0.85-1.25	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9442H*	0.40-0.48	0.95-1.35	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9445H*	0.42-0.50	0.95-1.35	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9447H*	0.44-0.52	1.15-1.55	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15
NE...	9450H*	0.46-0.54	1.15-1.55	0.20-0.35	0.25-0.65	0.25-0.55	0.08-0.15

Note 1—Phosphorus and sulphur on open hearth steel to be 0.040 per Phosphorus and sulphur on electric furnace steel to be 0.025 per cent Mx. each.

Note 2—Small quantities of certain elements may be found in alloy steel which are not specified or required. These elements are to be considered as incidental and acceptable to the following maximum amounts: Copper 0.35 per cent; Nickel 0.25 per cent; Chromium, 0.20 per cent; Molybdenum, 0.06 per cent.

Note 3—The chemical ranges and limits shown in Table I are subject to the standard permissible variations for check analysis shown in Table II.

Note 4—NE denotes National Emergency Standard Steel.
*New H steels.

TABLE II

STANDARD PERMISSIBLE VARIATIONS FROM SPECIFIED CHEMICAL RANGES AND LIMITS APPLICABLE TO H STEELS

Element	Limit or maximum of Specified Range (Per Cent)	Standard Variation Over or under the Limits Set
Carbon	All Ranges	0.01
Manganese	To 0.90 incl.	0.03
	Over 0.90 to 2.00 incl.	0.04
Phosphorus		0.005
Sulphur	To 0.060	0.005
	Over 0.060 not subject to check	
Silicon	To 0.35 incl.	0.02
	Over 0.35 to 2.20 incl.	0.05
Copper	To 0.50	0.02
	Over 0.50 to 1.00 incl.	0.05
Nickel	To 1.00 incl.	0.03
	Over 1.00 to 2.00 incl.	0.05
	Over 2.00 to 5.25 incl.	0.07
Chromium	To 0.90 incl.	0.03
	Over 0.90 to 2.10 incl.	0.05
	Over 2.10 to 3.99 incl.	0.10
Molybdenum	To 0.20 incl.	0.01
	Over 0.20 to 0.40 incl.	0.02
	Over 0.40 to 0.60 incl.	0.03
	Over 0.60 to 1.00 incl.	0.05
Tungsten	To 1.00 incl.	0.05
	Over 1.00 to 4.00 incl.	0.10
Vanadium	To 0.50	0.03

Weirzin

ELECTROLYTIC ZINC COATED SHEETS AND STRIP

takes it easy . . .

• *A highly ductile steel base and a coating that sticks with it*

If peeling, flaking, rusting are among your product problems—try a test sample of Weirzin. Weirzin consistently demonstrates a much higher fabricating efficiency and a remarkable resistance to heat and moisture.

Weirzin electrolytic zinc coated sheet and strip is available in coils or cut lengths from ⅜ to 35″ widths. Write for sample and technical booklet. Learn the definite business advantages of this revolutionary new material.

WEIRTON STEEL CO.

WEIRTON STEEL COMPANY

WEIRTON, W. VA. *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION** *Executive Offices, Pittsburgh, Pa.*

NATIONAL STEEL PRODUCTS

WHITCOMB

LOCOMOTIVES

Hours saved in repair work can be re-invested in increased production

Every WHITCOMB LOCOMOTIVE is so well built, so thoroughly designed and so utterly capable for switching and hauling, repair men seldom see them except in operation. In all history, time was never so important as it is now—and the reduction of hours spent on repairing WHITCOMB LOCOMOTIVES is a decided asset. Time thus saved can be used for other vital purposes, to the benefit of all.

WHITCOMB LOCOMOTIVES are built to give maximum performance at low cost, and nothing is overlooked to obscure these proven qualities. The frame, engines, electrical equipment, drive, control system, brakes, equalization, etc., are the results of years of specialized experience and unsurpassed resources. It is no wonder, therefore, that every user acclaims the WHITCOMB as the ultimate in simplicity, durability and economy.

BLW
THE BALDWIN GROUP

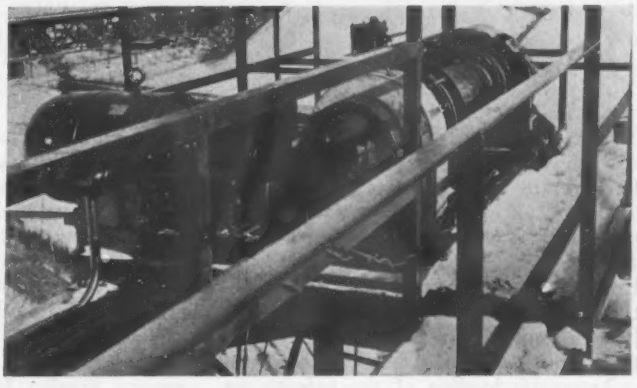
THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

Coal "Slicer"

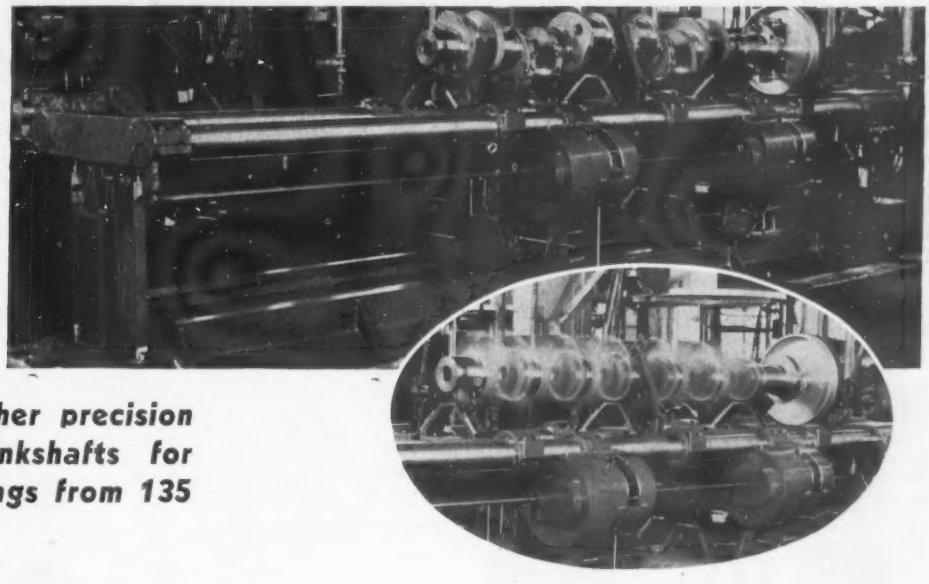
. . . speeds unloading of frozen and congealed coal by pulverizing for easy handling



SOFT coal which has frozen and congealed in transit will not pass through the unloading trapdoor of a gondola or hopper car, presenting a problem which heretofore has required makeshift means of pulverizing the coal. To speed coal unloading, the 2-drum electrohydraulic, friction-clutch worm-geared hoist shown here has been especially designed for operating a coal slicer. This hoist raises and lowers a slicer bar which chops coal, as shown in photo at top, so that it will flow freely through the underside trapdoor into the hopper of the conveyor. The slicer bar, in combination with the hoist, also helps to move coal from various pockets of the hopper car to the trapdoor. It permits fast and clean unloading, considerably reducing the amount of manual labor formerly required. The hoist eliminates the need for men to operate crowbars, sledges, and shovels. In some cases, it eliminates elaborate equipment such as thawing ovens or torches.

The coal slicer hoist, made by Silent Hoist & Crane Co., Brooklyn, N. Y., may be mounted on existing overhead bridge cranes and operated from the crane cab. With fingertip control, an operator can slice coal all day without fatigue. Capacity is 6000 lb at 105 fpm. In sub-zero weather, one user was able to unload 38 cars of frozen coal in a single day.

Oversize Dynamic Balancer



. . . shows way to higher precision in manufacture of crankshafts for diesel engines with ratings from 135 to 1200 horsepower

TO bring about even greater precision in manufacture of diesel engine crankshafts, one of the largest dynamic balancing machines ever built has been installed by Cooper-Bessemer Corp. in its Grove City, Pa. plant. It is equipped with dual compensators so that corrections may be indicated both as to exact angle and amount in any two predetermined correction planes. It will handle shafts with bearings up to 9-in. diameter and weighing as much as 5800 lb. Length of the largest of these JS-8 shafts tested on the machine is 15 ft. 7⅝-in.

According to Tinius Olsen Testing Machine Co., Philadelphia, which built the machine to Cooper-Bessemer requirements, use of dual compensators is a new feature which does away with any calibration whatever by giving a direct reading to the exact amount of unbalance at the two points of correction. Compensators remain set after readings are taken, thus revealing to operator after machine stops exactly where and how much correction must be applied.

Another interesting aspect of the new balancer is the center support roller with hold-down bracket to keep long crankshafts or other long rotating parts in perfect alignment during balancing operations. This eliminates whipping at high speed, and does not affect unbalance readings in either end of the shaft.

After extensive tests both on its forged and cast crankshafts, Cooper-Bessemer engineers predict that, combined with recent improvements in bearing design, greater precision than ever before will now be possible in manufacture of engines ranging from 135 to 1200 hp.

Continuous Drawing of A.P. Shot

. . . . holds down fuel consumption, provides flexible heat-treating cycle

By C. A. LITZLER
Chief Engineer
Industrial Oven Engineering Co.
Cleveland

PROCESSING of armor-piercing (A.P.) shot involves a number of heat-treating cycles. However, practically all plants now making shot utilize some such sequence as the following: Hardening and quenching, drawing, aging, cleaning, thermal shocking, crack testing, banding and final assembly.

A most important portion of this work is the drawing after hardening. Normally the physical layout of the plant is such that hardened shot are transported by conveyor to a relatively low-temperature draw furnace. The draw furnace itself on the smaller sizes of shot is normally a wire mesh belt hearth type, arranged for recirculating direct gas firing and with extremely close temperature control, so that drawing of all shot is consistent and within close temperature limits.

Automatic loading of the furnace on the smaller size is accomplished by a relatively simple self-unloading conveyor, which deposits the shot on the conveyor hearth without respect to arrangement on the hearth.

On the largest sizes of shot such as the 57-mm and 3 in., considerably elaborate charging and upending units have been provided so that the shot can be loaded onto the hearth directly from the quench tank, and then upended so that they can go through the furnace resting on their bases. Due to the size of the shot, setting them vertically on their bases results in considerable saving in original equipments, because of the decidedly decreased size of the unit.

The extra cost of the automatic index, loading and upending equipment is easily offset by the labor savings effected.

In all cases drawing must be done accurately as far as temperature is concerned. Smaller furnaces are in operation with temperature differentials of plus or minus 2 degrees and the larger furnaces on a plus or minus 4 degree differential across the entire furnace volume; front to back; side to side; and top to bottom. This assures absolute uniformity of hardness.

To emphasize the importance of this; one manufacturer had considerable difficulty in duplicating and maintaining hardness in the nose, consequently his shot failed in firing tests. After investigation, the trouble was found to be in uneven drawing temperatures, and after the furnace was balanced to plus or minus 3 degrees, complete penetrations again were effected.

After drawing, the smaller size shot are allowed to cool naturally, while the larger size shot run through a forced cooling zone at the discharge end of the furnace, in order to prevent the dissipation of the incipient heat of the shot from overheating the room and to facilitate further handling.

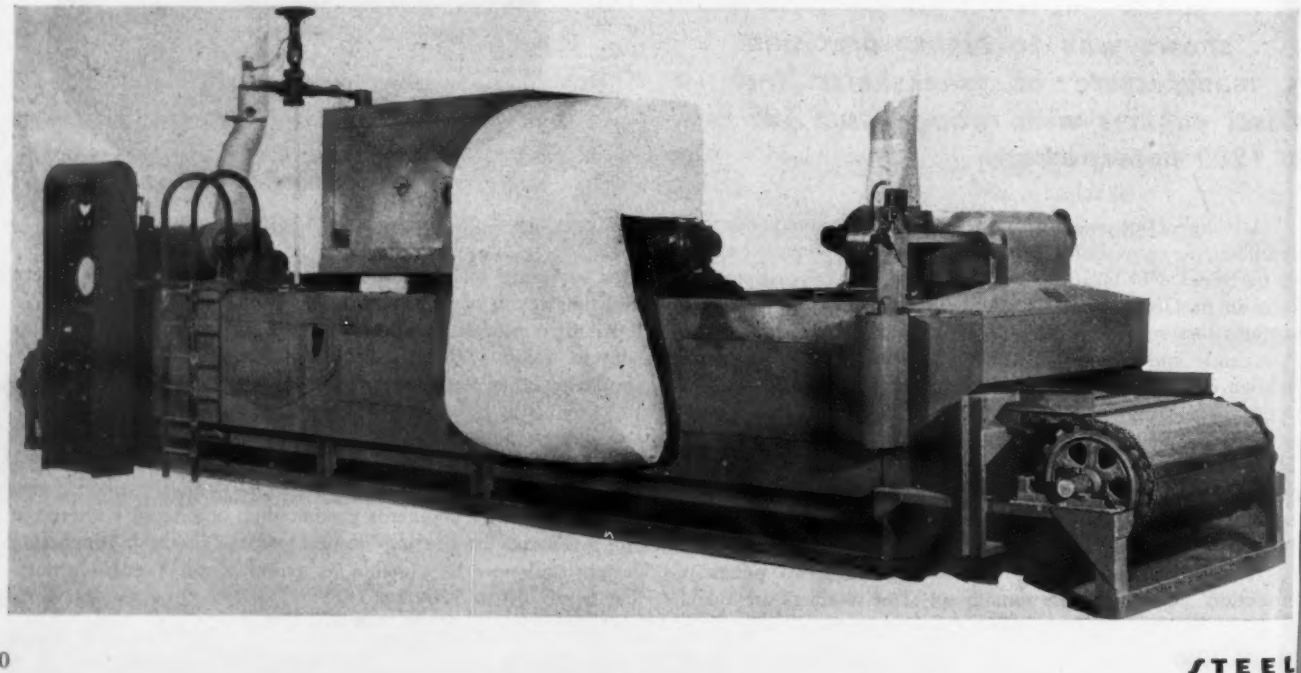
The unit illustrated here was designed for stress relieving armor-piercing shot in the plant of a large Ohio ordnance manufacturer. This continuous draw furnace is built for operation at temperature ranges up to 900°F. and maintains absolute uniformity of temperature throughout length, width and height of the work zone within limits of 3 degrees plus or minus the desired temperature.

The same uniformity within the work itself is obtained by (1) passing air at extremely high velocities over the work on the conveyor belt, and (2) automatically turning the work as it passes through the furnace. As a result of the rapid heat transfer so induced, the load is brought up to temperature in a very short time.

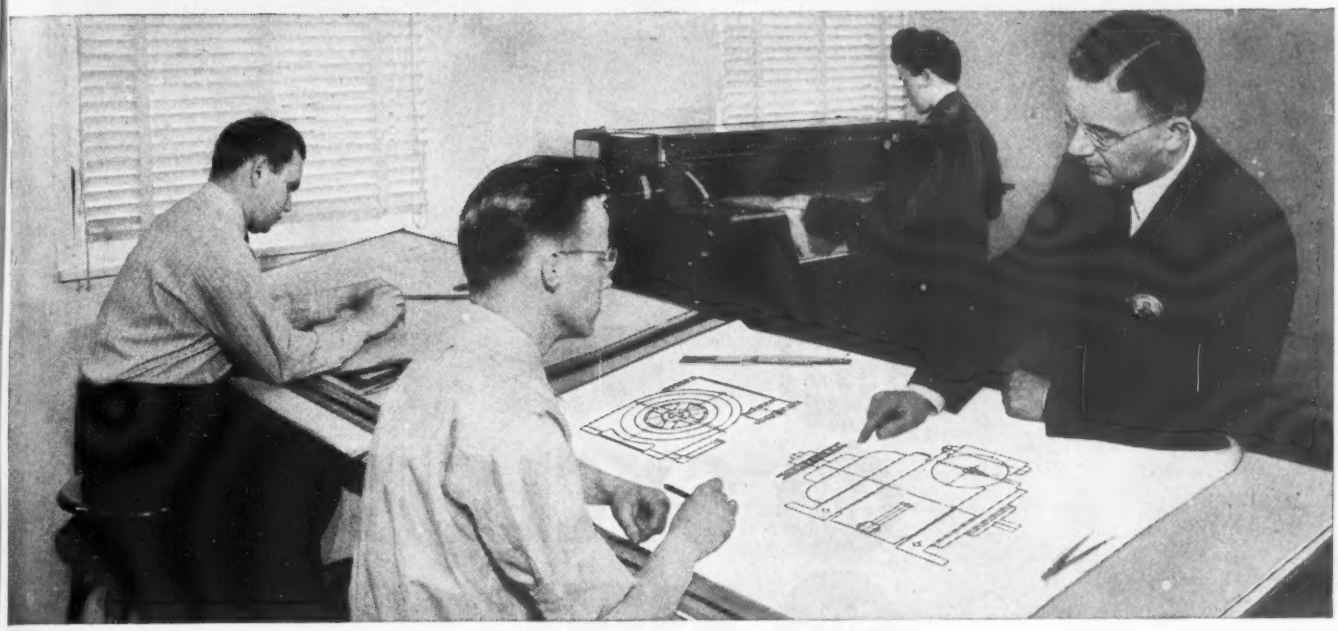
The unit is operated by one woman who

(*Please turn to Page* 126)

Efficiently designed air heater, duct and recirculation system enable this continuous draw furnace to operate at actual cost 25 *per cent below original calculations*



The fastest, most economical way to change your drawings!



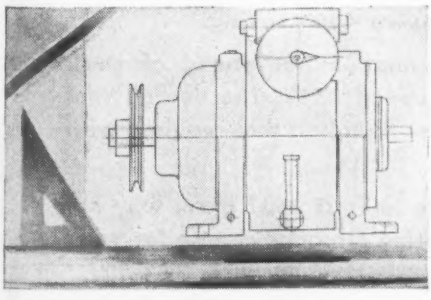
You're off to a flying start . . . when you give the draftsman an OZALID INTERMEDIATE (translucent) print of any drawing that must be changed.

For an Ozalid Intermediate is made in an OZALID machine in seconds, in exactly the same manner as any other type of OZALID print.

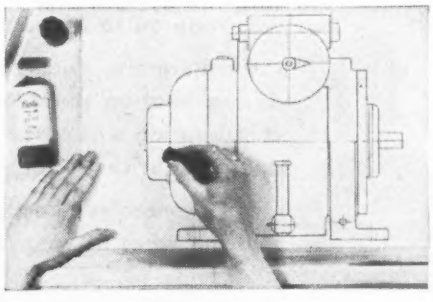
No additional equipment is required; nor is it necessary to change the developing solution.

Even more important savings in time and labor are realized in the next step. For all that the draftsman need do now is remove the obsolete lines with Ozalid Corrector . . . and draw in the new design.

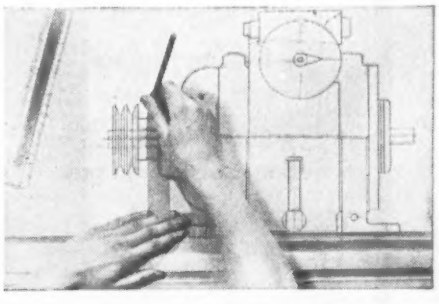
He never has to redraw any line that remains the same!



1. This is an Ozalid Intermediate (translucent) print of the original drawing.



2. Draftsman eradicates obsolete lines with quick-drying OZALID Corrector Fluid.



3. New design is drawn in. Work-prints can now be made from this translucent "master."

Ozalid Intermediates may be made on paper, cloth, or foil. With or without design changes, they may be substituted for original tracings in print production. Or sent to branches or subcontractors for printing.

Ozalid Work Prints supply drafting room, assembly lines, and offices with reproductions of anything drawn, typed, or printed on translucent paper. Prints have *black, blue, or red* lines—as desired—on white background. Colors may be used for identification.

Ozalid Specialties include Chartfilm and Dryphoto. Chartfilm gives lustrous, black lines on a waterproof, oilproof, white plastic base. Dryphoto reproduces *continuous tone photographs* quickly, economically, beautifully, in black, sepia, or two-tone (blue-brown) effect.

All in all, there are 10 types of Ozalid prints. See them and learn all about the versatility that is yours *only* with Ozalid. **Write for free "10 instead of 1" booklet today.**

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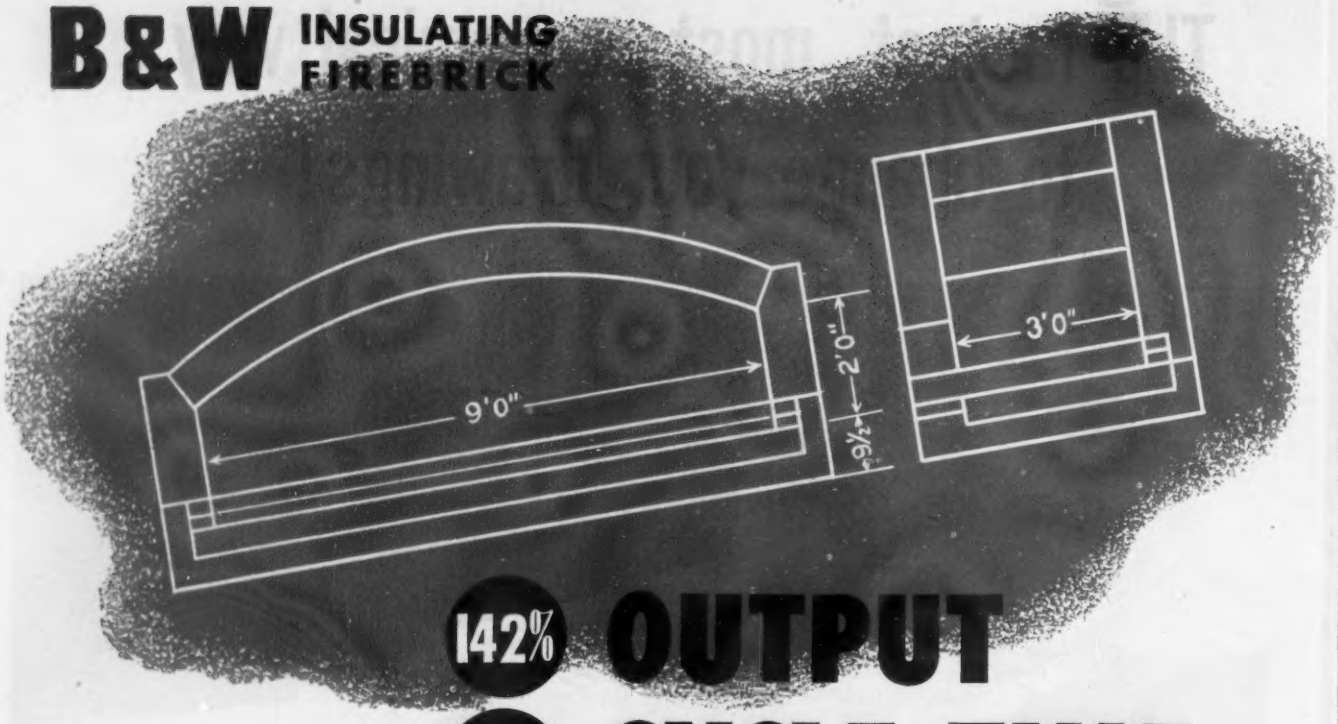
B&W INSULATING FIREBRICK



142% OUTPUT
60% CYCLE TIME
50% FUEL

An Illinois gas-fired forge furnace produced 70 pieces per hour in furnaces lined with first-quality fireclay brick. When B&W K-28 Insulating Firebrick were substituted, output jumped to 100 pieces per hour—over 42% increase.

The cycle time for heating up charge and forging was formerly 50 minutes. With B&W K-28's the cycle was reduced to 30 minutes—a 40% saving.

Furthermore, fuel consumption per pound of stock during heat-up period dropped 83%. The overall fuel consumption was cut to less than half that required with dense firebrick.

Do economies like these interest you? If so, why not find out what B&W Insulating Firebrick can do for you?

FURNACE DATA

TYPE
—forging furnace

FUEL
—800 BTU natural and manufactured gas

TEMPERATURE
—2400 F.

THE BABCOCK & WILCOX COMPANY
Refractories Division
85 Liberty Street, New York 6, N. Y.

R-212

Hot Patching of OPEN-HEARTH FURNACES

By EDWIN N. HOWER
General Masonry Foreman
Homestead Steel Works
Carnegie-Illinois Steel Corp.
Munhall, Pa.

COST of hot work plays an important part in the overall cost of operation in an open-hearth shop. Labor and material cost may range from 5 to 25 cents per ton of steel produced. Hot work time, depending upon the individual shop condition, will generally range from 4 to 15 min. per heat and represent from ½ to 2 per cent of actual operating time. Shops which are operating near the top of these ranges may have an excellent opportunity to effect worthwhile savings by a careful analysis of their hot patching practices.

Good working scaffolds are helpful in speeding up repair jobs and contribute to better workmanship. Prefabricated semipermanent scaffolds which can be placed on the furnace by the cranes are worth the trouble involved in storing them when not in use and the extra expense of fabricating them. Prestocking the job is generally advantageous and the use of mechanical equipment will often aid in speeding up the job and keeping costs down. Slight alterations in furnace design and construction will frequently return dividends in the speed and cost of hot repairs. Unless the skew angle is 4 or 5° less than the radial angle when installed, the bricklayers will have trouble when it becomes necessary to make patch repairs.

On furnaces where endwall repairs are rather frequent and of large extent, the use of a water-cooled box at or near floor level will speed repairs and generally save making awkward, costly patches below floor level.

Types of Roof Patches

Three main classifications of roof patches are: (1) Saddle center patches in which a few rings are knocked out and replaced one by one with the center being moved for each ring. (2) Sheet-iron patches in which thin sheets, generally corrugated iron, are bent to conform with the arc of the roof and supported just beneath the inside of the roof when replacing a comparatively large section at one time. (3) Special brick patches.

Saddle center method is probably the most versatile, and in the majority of small jobs the fastest. On furnaces having narrow roofs with small radii and those having pronounced slopes at the necks it is adaptable. The sheet-iron center method is widely used on large furnaces and is most effective for large patches. The time required to place the center for a large patch is but little more than for a small one. Special brick shapes may be used independently for patching or in conjunction with either of the other methods. The economy of special shapes is generally doubtful but in certain instances their use can be justified. Patches should always be so constructed as to maintain proper roof contour and avoid buckling. See Fig. 1.

Refractory guns are meeting with general approval and are helping to eliminate or reduce many large brick jobs. They are especially useful for placing material along the top of the backwall to protect the skewbacks, and in some cases to place material at the top of front wall pier. They are effective for placing refractory material in a hot furnace with a minimum of lost time and seem likely to become an important factor in the reduction of furnace repair costs.

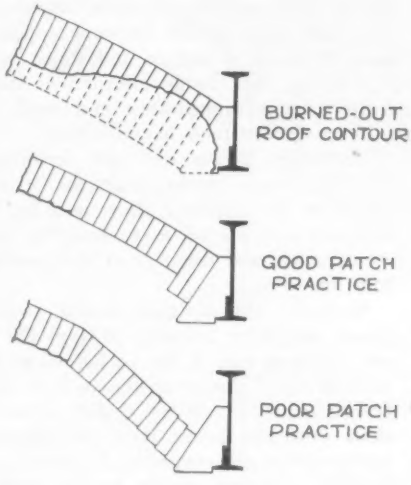


Fig. 1—Methods for making patches

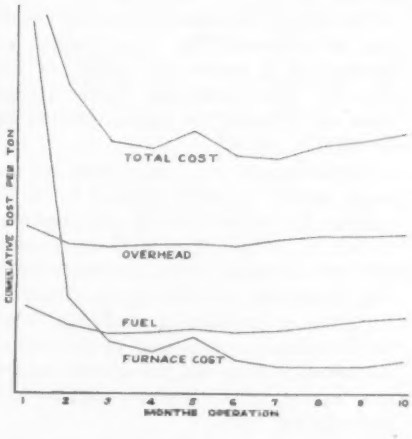


Fig. 2—Comparison of costs for furnace campaign

Cost per ton is the deciding factor in determining the length of a furnace campaign. Cost figures charted in Fig. 2 are cumulative for the entire length of run. The furnace is assumed to share in the shop overhead in inverse proportion to its tonnage output as compared with the average shop tonnage. During the theoretical campaign illustrated the overhead was high at first due to slow time of heat when starting the furnace, decreased gradually to the middle of the campaign, and then rose as the furnace began to slow up because of leakage and clogging in the pockets and checkers. Fuel costs follow a similar pattern since they are closely related to tonnage output.

Furnace Cost Curve

Furnace cost curve, which is the cost of the rebuild plus the cost of hot patching, is more irregular than overhead and fuel. For the first month or two furnace cost was high since the cost of the rebuild was shared by only a comparatively small tonnage. In the third and fourth months it began to level out near its final value. The sharp increase in furnace cost in the fifth month was caused by a large repair job. The continued reduction in furnace cost during the sixth and seventh months justified the cost of this job. Furnace cost continued low for two more months and finally rose during the last month because of the necessity for heavy patching.

Examination of the total cost shows that the economic time to have taken this furnace off for rebuild was at the end of seven months, as the increase in fuel and overhead overbalanced the small reduction in furnace cost after this time and after the seventh month the total cost was increased for every ton of steel made since the campaign began.

These curves do not cover all factors which must be considered in the operation of an open-hearth furnace, but they do give an indication as to the proper length of campaign and the effects of hot patching on furnace costs.

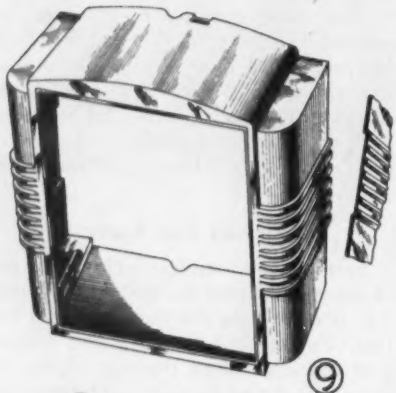
Abstract of paper presented before Open Hearth Committee, A.I.M.E., Pittsburgh.

—o—

Coating ingot molds serving the open hearth department of a Mexican steel plant with a thin slurry of loam gives to the ingot surface the same smoothness and freedom from cracks as a steel casting. The coating does not chill the metal as it flows past the mold walls; it is contained in the outer skin of the ingot and comes off with the scale during the first pass in the blooming mill.

Consider These Factors in Designing Products for DIE CASTING

Additional fundamental data are presented on possibilities and limitations of the die casting process in second and concluding article by members of New Jersey Zinc Company's technical staff



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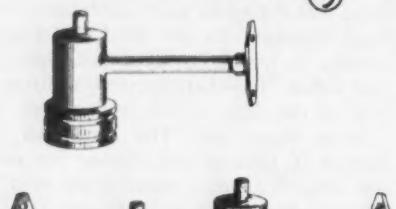

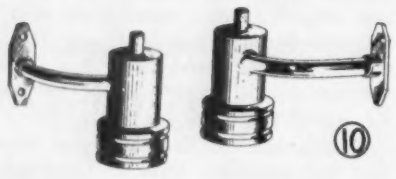

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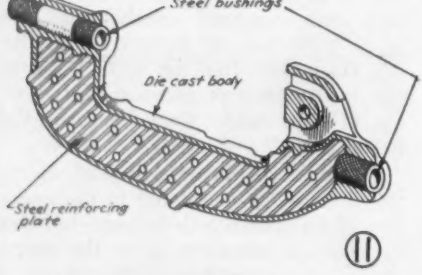

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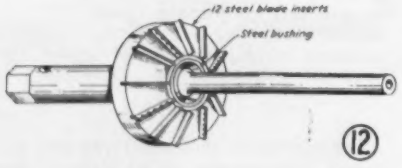

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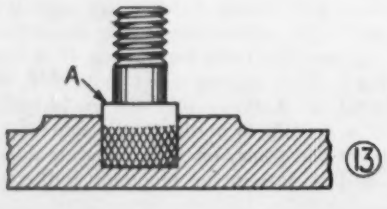

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IN DESIGNING products for production by the die casting process, plain flat surfaces of any considerable area should be avoided if they must be cast exceptionally smooth for finishing. Such surfaces lead to high rejections and, hence, increased costs.

To eliminate the problems involved in casting surfaces that are truly flat without introducing imperfections that are magnified by glossy finishes, it is suggested that surfaces be curved or crowned—or be broken by beads, steps, of low-relief. Such simple expedients have a tendency to mask slight imperfections and often greatly improve appearance. A crowned surface and steps (See Fig. 9) are two design alternatives that result in good appearance and tend to mask minor surface irregularities.

Lettering: When die cast lettering, numerals, trade marks, diagrams or instructions are required, they must be so designed and placed as to facilitate die construction and removal of the casting from the die.

Normally, the designer should specify raised engraving because it is easier to cut a design into a die surface than to make a raised design on the surface. Debossed engraving on the casting is much more expensive in die cost, and deterioration of the die engraving is more rapid because of faster erosion by the molten alloy.

If the engraving on the casting may not project above the surrounding surface of the casting, debossed engraving usually can be achieved by using raised engraving on a removable panel set into the die. The panel may have stippled areas to enhance the appearance of the product.

Engraving is preferably done on surfaces parallel or nearly parallel to the die parting. In no case should any engraving constitute an undercut such as to interfere with ejection of the casting from the die. Engraving is often used effectively for scale or graduation markings. When the engraving is debossed in the casting, the recesses often are filled with paint or are "wiped in" to provide contrast with surrounding areas.

Cores: Cores help to keep section thickness relatively uniform, and also provide holes accurately sized and precisely located. Cores which are fixed to or form integral parts of the die are least expensive, but usually have to be placed so that their axes are parallel to motion of the movable die section. Consequently there is often an advantage in so designing the casting that fixed cores are the only ones needed. There are, however, many castings which require cores at some other angle, and they then must be made movable and provision must be made for their operation. This may result in increased die cost and reduced casting rates, but the expense frequently is justified.

The larger the core diameter in relation to its length, the sturdier it is, and breakage is less likely. The approximate minimum core diameter considered feasible for zinc is $\frac{1}{32}$-in.; for aluminum, $\frac{3}{32}$-in.; and for magnesium, $\frac{3}{32}$-in. Under some conditions, even smaller cores can be used, especially if they are quite short. For economy, large, deep holes always should be cored. On the other hand, if the diameter of the hole is small, it is frequently as economical to drill or punch the hole as to core it.

As slender core pins are easily bent or broken, it is advisable to avoid such cores by using a short core and drilling the cored hole deeper. Generally it is feasible to use cores having lengths at four times the diameter, but if they are ½ to 1 in. in diameter, the length usually can be as much as six to eight times the diameter.

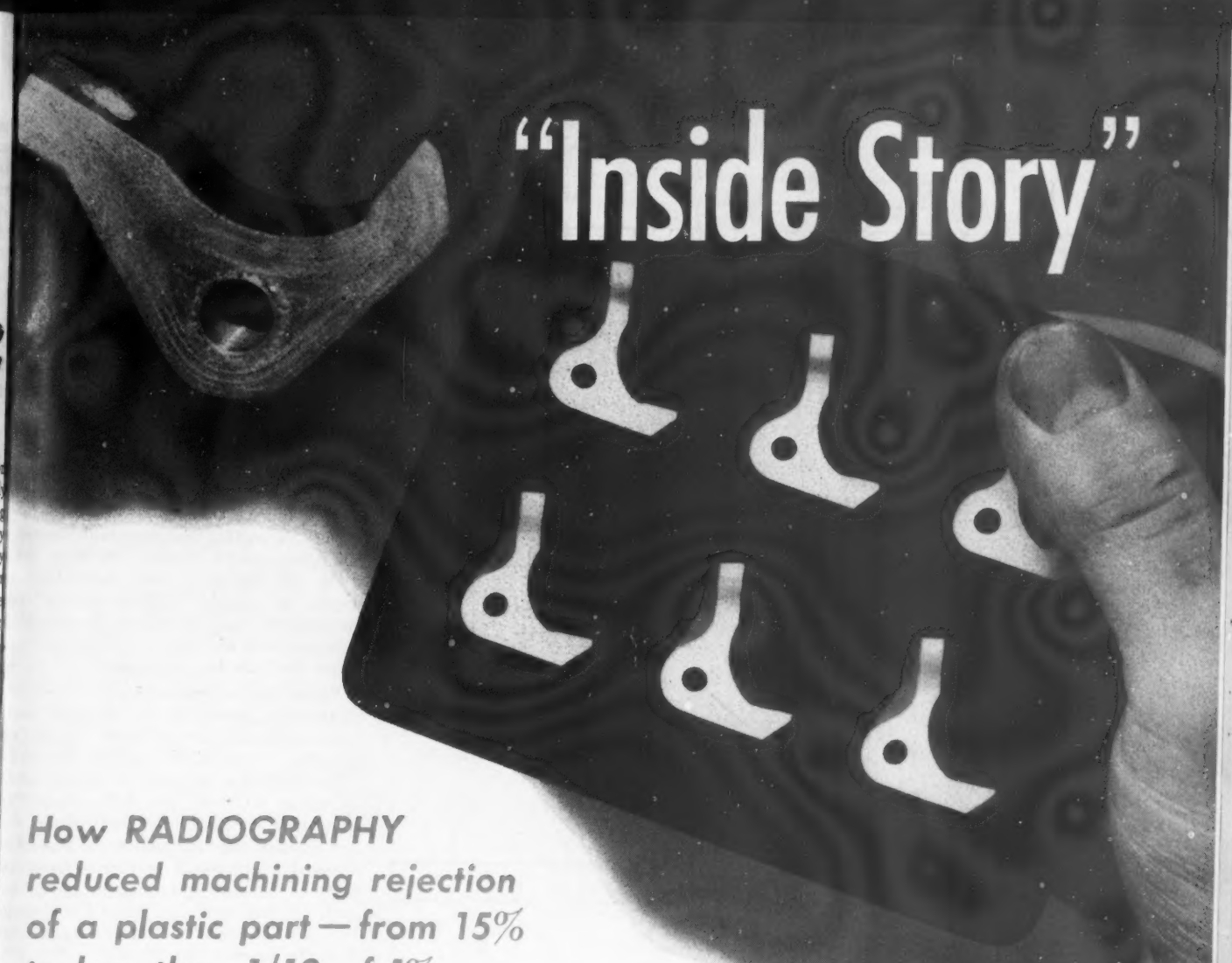
Cores which intersect or must form a joint with each other are often feasible, but are likely to result in flash that is somewhat inaccessible and may be rather awkward to remove.

Collapsible cores made in two or more pieces are likely to be expensive and to retard the casting operation, but they frequently accomplish results not otherwise attainable.

Pointed cores often are used to spot holes which are to be drilled later. Holes in such a position that they cannot be cored can often be spotted and thus facilitate subsequent drilling.

Holes can be formed by a threaded core, but in such cases the core has to be unscrewed from the casting or the casting from the core. It is usually cheaper and faster to tap the hole than to cast the thread, unless a very coarse or odd shape of thread is needed.

Draft Allowance: Ample drafts should be allowed both on cavity walls and on cores. As is common with other casting methods, drafts are necessary. They must



How RADIOGRAPHY reduced machining rejection of a plastic part—from 15% to less than 1/10 of 1%

ON the scrap heap every week went 750 completely machined plastic lever assemblies—15% of a week's production—turned down "cold" on final inspection. What to do about it? Radiography found an answer . . .

Through 100% radiographic inspection, the manufacturer traced failures to a drill hole lined with a metal insert . . . around which excessive stress concentrations originated . . .

So far, so good. With the source of trouble uncovered, the manufacturer had something to go on . . . had a point of departure for his engineers—and, as it turned out, for his supplier of raw materials.

New machining technics were tried . . . each step was x-rayed . . . results were analyzed.

This continued study brought the manufacturer—and the co-operative maker of plastic stock—to a point where they could definitely say, "Here's what's wrong." The plastic bars from which the failing part was being cut, while of excellent quality, were not of exactly the right type for the manufacture of this specific part . . .

A change was made, machine technics were improved, the problem was whipped. Rejections tumbled from 15% to less than 1/10 of 1% . . . costs dropped proportionately . . . production was stepped up.

Literally an "inside story"—based on internal study of a failing part. Here again we see radiography as a helper, investigator, business builder. In plants from coast to coast, x-ray helps industry meet rigid inspection standards. Its record of accomplishment in increasing quality, lowering costs, and speeding up production is an indication of radiography's importance tomorrow. Now is the time to consider what it can do for you. See your local x-ray equipment dealer.

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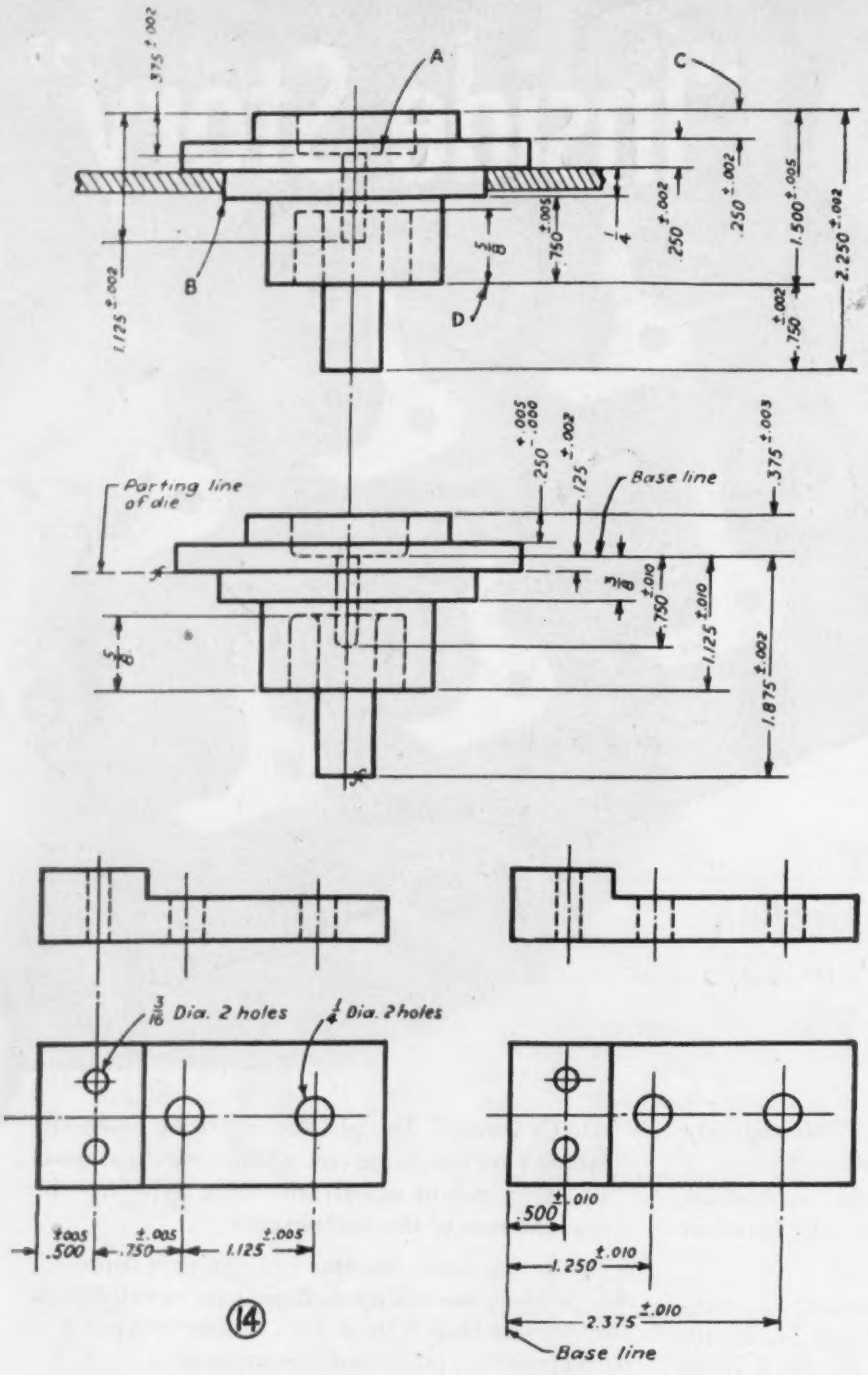


be provided in order to eject castings from the die. Though drafts can invariably be less than for sand castings, they should not be made so small as to cause distortion by interference with core pulling or ejection of the casting.

The minimum drafts for certain conditions were shown in Table I of preceding article. The total draft required increases with the "draw" (that is, the depth of the casting in the direction of core motion or of ejection) and is greater with the alloys of higher melting point.

The draft sometimes is indicated by giving tolerances plus the taper for the length or depth involved but, where only fractional dimensions are given without tolerances (indicating that close dimensions are not required) or where wide tolerances are indicated, it is customary for the die designer to allow a draft where it is needed although not indicated on the drawing.

When there is no good reason for using the minimum draft required, die and core life can be extended by allowing generous draft but more draft than is needed may require heavier cuts and somewhat greater machining cost if the draft has to be removed by machining.

A frequently observed advantage of zinc alloys is the ability to core holes to tapping size, the slight draft being of no significance. Where a minimum draft appears essential, the die caster should be consulted to make sure that the draft is sufficient, and not so close as to interfere with satisfactory casting practice.

Tolerances: Never specify tolerances closer than are essential to meet requirements.

As it may cost much more to hold close dimensions than to allow them to come within somewhat wider limits, there is no point in demanding close limits when they serve no essential purpose. They should not be closer than can be held on mating parts and, where no fit with anything is necessary, it is sufficient to give a fractional dimension without any limits. This indicates that only scale dimensions are required, or that the dimension need not be held closer than plus or minus 0.01 in. per inch of nominal size, or within 0.01-in. of such size when the dimension is less than 1 in. When tolerances closer than average are essential, the die casting engineer should be consulted to determine whether or not they can be held. If they are so close as to require machining, an allowance for the extra cost should be made.

Dies for casting alloys of high melting point are subject to heat checking, and when this happens, they must be redressed if smooth surfaces are to be maintained. This, of course, changes the dimensions of the casting and affects the limits that can be maintained.

Where close tolerances are essential, dimensions should be in decimals and both upper and lower limits should be specified. For zinc die castings, the minimum tolerance, as cast, is usually plus or minus 0.001-in. per inch where the dimension is within solid parts of the die not having relative motion. Where the dimension is across a parting or between parts of the casting formed by die parts, such as cores or slides, wider limits must be specified or provision for machining must be made.

Bending and Forming: Ductility of zinc alloys should be taken advantage of, where zinc is to be used, by designing parts for bending or forming after casting. This ductility makes it possible to shape integral flanges to curving contours, to bend hollow arms, to spin out undercuts, to upset odd projections or to twist parts of the casting through 90 degrees or more.

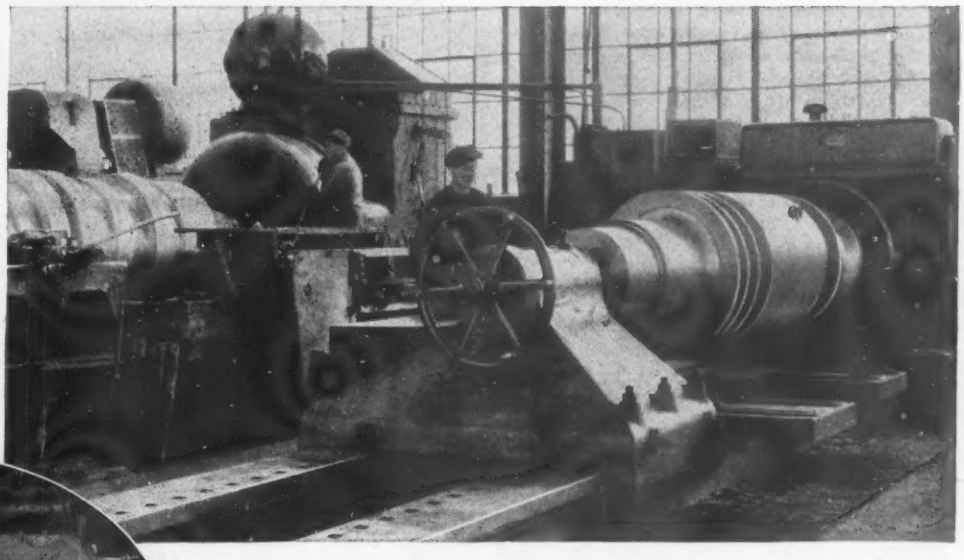
Often it is possible to employ a flat parting and to core holes or to provide bosses or integral studs at right angles to the parting, subsequently forming the casting so that the axes of these elements are no longer parallel.

Thin plates with cast bosses or holes at right angles to the surface require much less costly dies than if cast to a curved shape.

Fig. 10 illustrates another possibility. The bracket is die cast with a straight tubular portion subsequently bent, one to the right, one to the left, forming a pair. A single die serves for casting both parts and, by having the tube straight, the part is feasible as a die casting where it would not be feasible to die cast the curve.

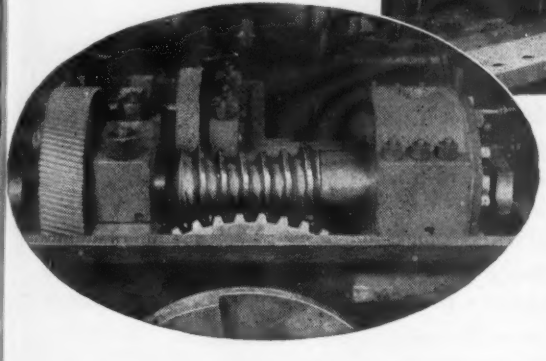
Inserts: Inserts should be employed whenever their use attains results that cannot be realized at equal cost by other means. They are used for one or more of the following reasons. To provide greater strength, hardness, wear resistance, ductility, flexibility or some other property not possessed, at least in the same degree, by the casting itself, as in Fig. 11; to

CONE-DRIVES "SELL" MACHINE TOOLS



RIGHT: New United CONE-DRIVE geared Roll Lathe. Note size comparison with former lathe at left of photo.

BELOW: Note compactness of United's new headstock—due to Cone-Drive gearing.



That's what United Engineering and Foundry Company found, not only when it adopted CONE-DRIVES for rolling mill screw-downs, but again when it re-designed its heavy duty roll lathes using CONE-DRIVE geared headstocks. The first three delivered sold eight duplicates.

According to United, in addition to the vastly higher load carrying capacity of CONE-DRIVES, this gearing accomplished "perfectly steady or uniform surface speed when cutting". Greater compactness and less floor space were also benefits derived from the use of CONE-DRIVE.

If you do not know the reasons why CONE-DRIVE gearing is the POSTWAR gearing for machine tools and other purposes, ask for Bulletins listed at left.

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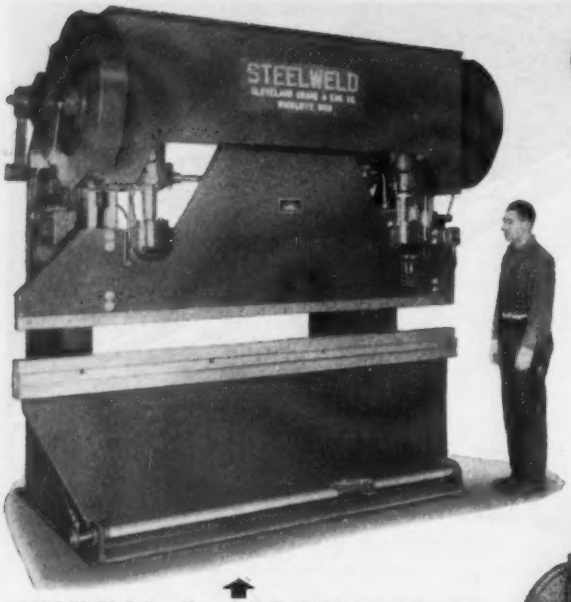
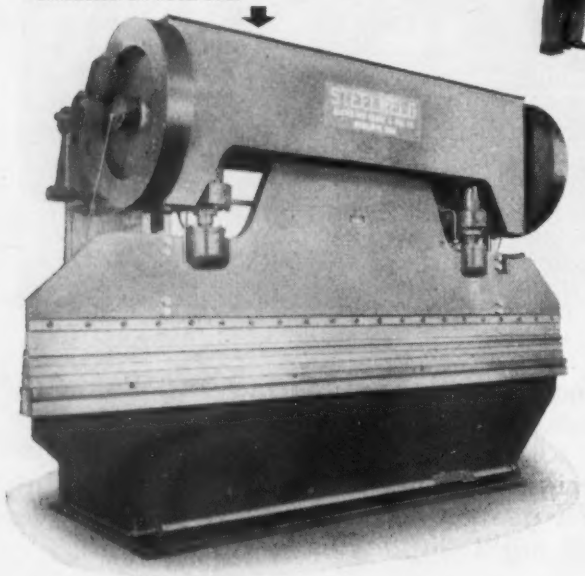
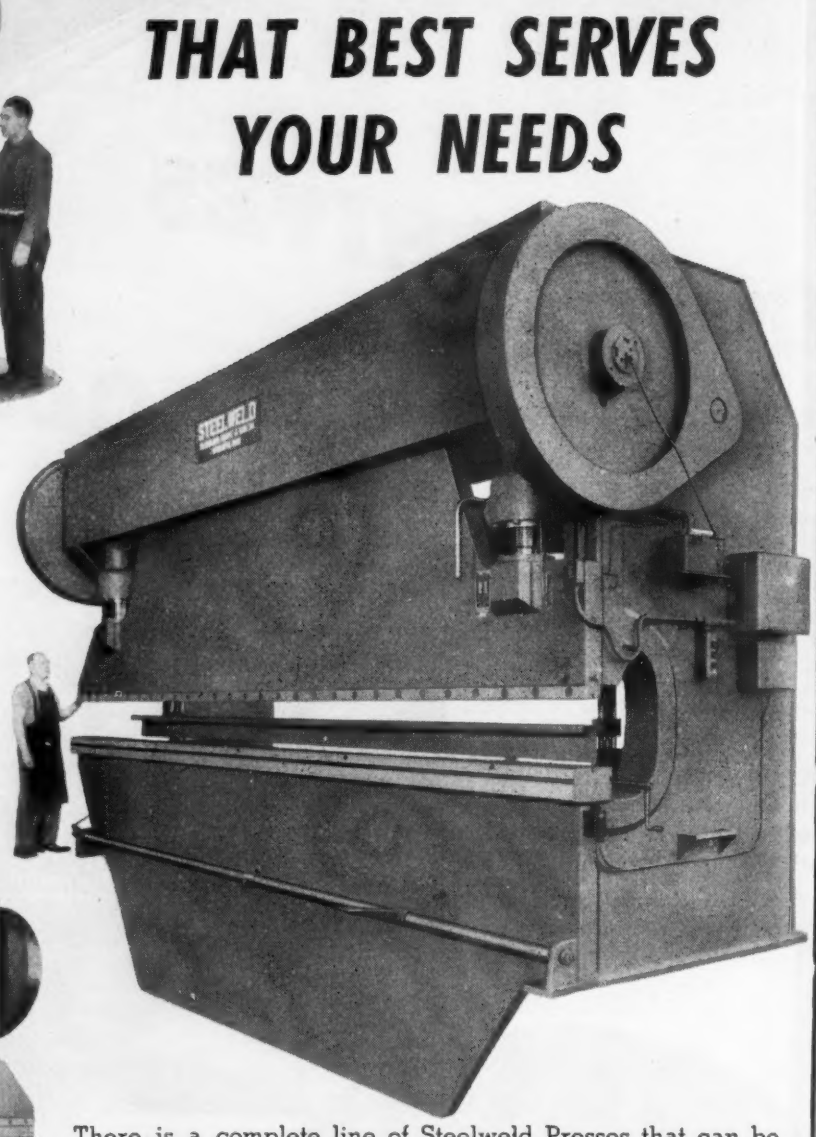


MODEL F3-6 handles plate 6' x 1¼" between housings and 9' x 5/16" over entire length of bed and ram. Has 1'-0" extension on left end.

MODEL J4½-16 bends cold steel plate up to 19 x 3/16" or 8' x 1/4". Because of distance between housings, bed extends below floor to assure straight, accurate bends.

MODEL H3½-8 for braking, forming and punching plate 8' x 1/4" between housings and 14' x 3/16" over entire length of bed and ram. Provided with 2'-0' extension on each end.





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rovide shapes of parts or passages which annot be cored or cast, or which are heaper or better as inserts; and to effect n assembly not so readily or so inexensively achieved by other means, as in ig. 12.

Usually, inserts are cast in place, but here are many instances in which they re applied after casting, in holes cored or the purpose. The objective of casting he insert in place is either to anchor it ecurely or to place it in a position where, otherwise, it could not be placed after asting.

When inserts are designed for casting in place, they should be provided with knurling, holes or grooves to insure a firm anchorage. Provision should be made for a sufficient thickness of the casting alloy around the insert to give the required support to the latter. Inserts should be made so that the casting metal cannot flow over surfaces which should not be covered. For example, in the case of inserted studs, the thread should not extend closer that 3/32-in. to the casting, as otherwise the thread may be filled by molten metal. Because of variations in the diameter of inserts, a shoulder or other sealing surface should be provided, as at A, Fig 13, between the end thread and the casting to prevent any flash around the insert from entering the threads. A washer resting against such a shoulder will confine the stress incident to tightening a nut on the stud within the metal of the stud itself, and avoid any tendency for the tightening to pull the stud from the casting.

Machining: Castings should be so designed that a minimum of machining is needed and that any essential machining is easily done. Some die castings need no machining other than flash removal, but most castings require some machining, especially where closer limits than can be cast are required.

Drawings should show where machining is to be done and should indicate how much metal is to be removed in machining unless this is left to the die caster's judgment. Surfaces needing machining should be of minimum area, consistent with other requirements, and should be so disposed as to be easily machined. Often flats can be trued by sanding or other simple grinding if the surfaces to be ground are accessible. Having flats (such as boss faces) all in one plane expedites grinding. Such surfaces may well be slightly above surrounding areas that need no machining, so that only the high surfaces are touched by the abrasive or cutting tool.

When the number of castings needed from a die is small, the die usually must be moderate in cost and it may be necessary, in order to save machining on the die, to do some machining on the castings that would not be necessary if a more expensive die were warranted. Advice of the die casting engineer may be sought in such circumstances.

Small holes in thin sections (up to ⅛-in.) are often drilled or punched in preference to coring, as flash usually has to be removed by these tools in any case. It is almost as quick to drill or punch the full depth of the hole as to merely remove the flash, especially if the hole has been spotted by a short conical pin in the die.

Trimming: Castings should be designed so as to minimize trimming costs. Flash always occurs at die partings, and its removal usually constitutes a considerable factor in the cost of the castings. This is one phase of machining that is practically unavoidable, but the cost can be minimized by bringing the flash where its removal is most easily and quickly accomplished.

Flash at the parting is commonly removed by a shaving die through which the casting is forced by a press. If the parting is in a single plane, preferably at right angles to the motion of the die, the flash is easily sheared, but if the parting is not in a single plane, greater cost is incurred in flash removal.

When the flash occurs at a flange or bead, rather than in a recess or on a flat surface, flash removal is facilitated. Frequently, flash can be made to come on a surface or edge where other machining is required and, when this occurs, a separate flash removal operation is avoided.

Flash which runs along a flat surface, and is not at the extreme edge of the casting, is difficult to remove cleanly without leaving tool marks on adjacent surfaces.

Tubes from Spiralled Strip

Method has been devised by Agaloy Tubing Co., Elizabeth, N. J., for stretching strip in a longitudinal direction during cooling to produce a strong tubular structure without welding or brazing. By this technique, cold rolled strip is coiled into tubular forms, such as spirally coiled tube with inside or outside fins; edges overlapped with protrusions either inside or outside; and open-seamed coils are formed to accurate dimensions. Forms are not suitable for carrying liquids, pressure applications, etc.

Finishing: All die castings can be plated. Those based on zinc continue to find extensive use because of the ease and economy with which such finishes can be applied.

Many design factors have an influence upon the ease of applying and of maintaining a satisfactory finish on die castings. It is especially important, when a part requires plating, that all significant areas to be plated can be reached by the buff employed to prepare surfaces for plating. The following salient facts deserve consideration in designing die castings to be plated:

—Deep or narrow recesses or sharp internal corners tend to entrap buffing compound and are difficult to clean properly. Raised faces absorb most of the current, making it difficult, if not impossible, to plate deep or narrow recesses. Recesses in which gas can be entrapped should be avoided. Surfaces in such deep recesses will not be plated and the flow of excess gas over the surrounding surfaces may cause peeling and poor appearance.

—Generous radii in re-entrant angles prevent the necessity for applying excessive thickness of plate to insure meeting minimum coating requirements at the radii.

—Sharp outside edges, corners and points should be avoided because deposits on such areas tend to be rough and brittle.

—Deep concave areas are difficult to plate without special racking because of low current density in the recess. Convex surfaces are easier to plate than flat surfaces and are less likely to reveal slight irregularities.

—Where beads are used for decorative effects, it facilitates buffing to have the beads parallel to the length of the casting and in the plane of the buffing wheel. Intersecting beads are best avoided.

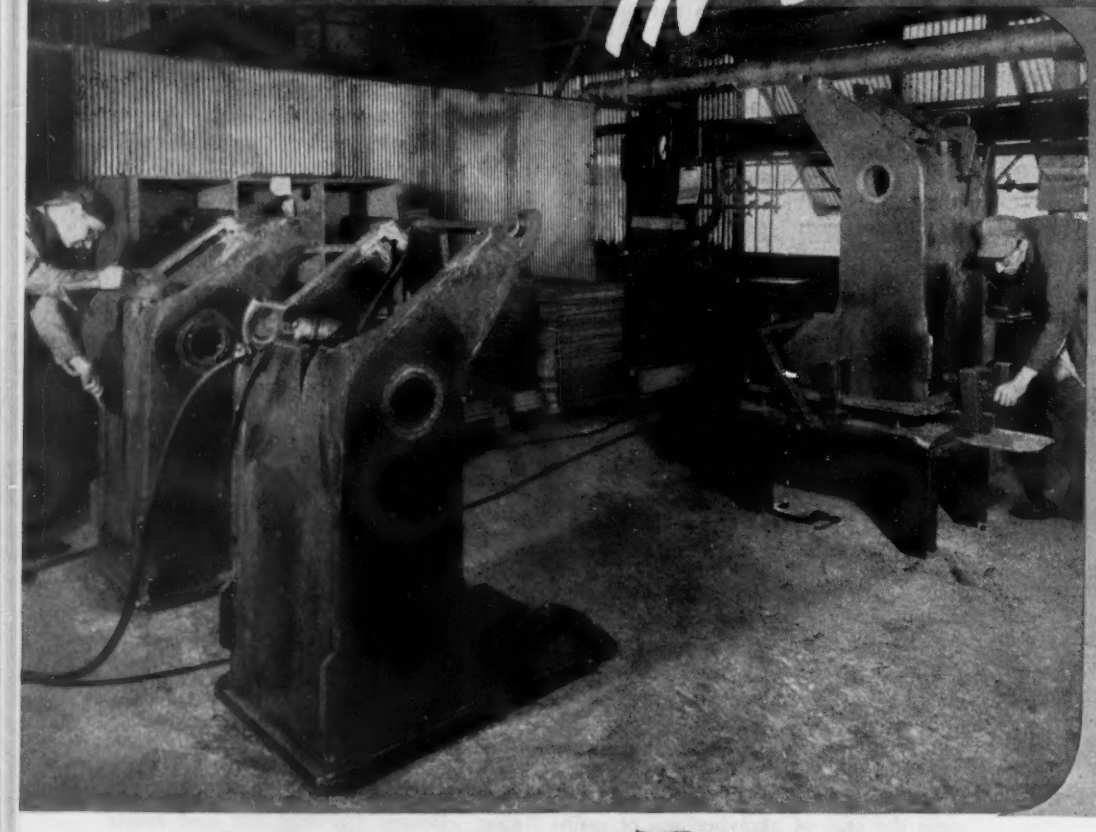
Most parts to be plated must be buffed, and a brilliant luster cannot be obtained in areas which the buffing wheel cannot reach. Large radii help to facilitate buffing.

Base-line Dimensions: In all die casting designs in which close dimensions must be held, it is desirable to select a "base-line" (actually a surface) to which all critical dimensions are referred. This surface is preferably one that remains as cast and should be a surface that is substantially unchanging throughout the die life, being unaffected by wear, especially of moving parts. The surface thus chosen becomes the locating surface in machining fixtures and for gaging and insures that the casting will clean up when machined.

Selection of the base-line is left either to the die caster or should be chosen in close co-operation with him. In so doing, it should be determined which dimensions must of necessity be held within close limits so that the part will perform its function, will mate properly with other parts of the assembly in which it is used and will clear other parts where clearances are essential. Dimensions that determine interchangeability are of first importance, and those that make no fit and govern no clearances are secondary. To insure utmost economy, the die caster often selects two or more different base-lines and, by making a study of their effect upon casting, machining and gaging, chooses the one that best meets conditions imposed.

In Fig. 14, drawing No. 1 (of a part to be die cast) appears as it might be submitted by a purchaser. Drawing No. 2 is the final drawing after the base-line is selected. The casting is for mounting against the flange, the mating part being indicated by shading in drawing 1. A critical dimension is the distance from surface A to the seated flange surface. B is a step diameter that locates the part transversely. Dimension D (⅝-in.) is the

WELDING WITH BOTH EYES O
IN VOLUME



Lower Left:
Simple "setup" fixtur... lower cost—insure ac... curacy in following op... erations—

Upper Left:
Multiple positioned welding speeds production—assures soundness of welds—

Upper Right:
Rigidity that permits fast cutting is secured by proper fixtures on the right machine—

Lower Right:
A combination of 5 precision operations become simple with proper tooling—cuts cost and delivery time—

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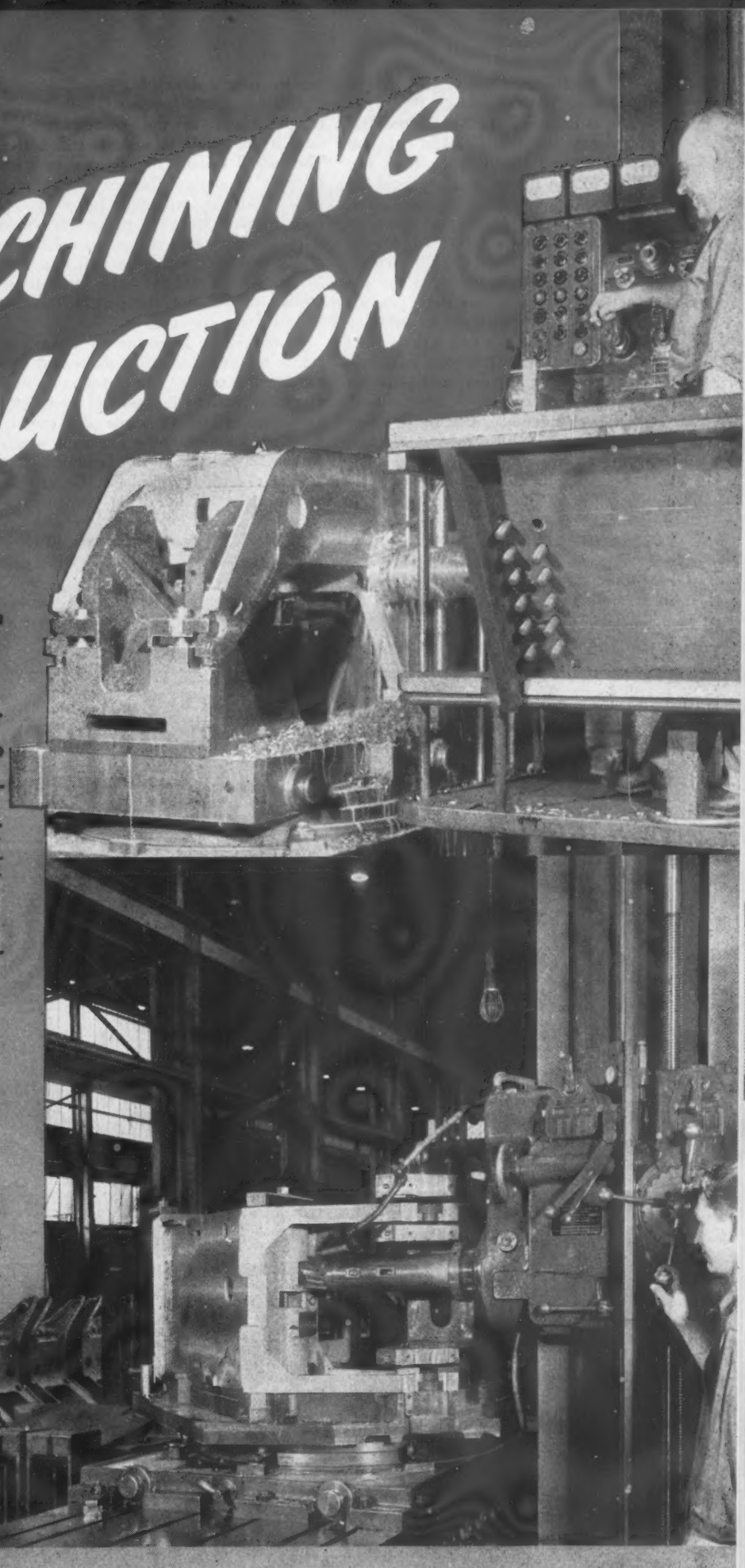

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depth of a clearance recess. Dimension C is important but not critical. When the base-line is chosen as in No. 2, essential requirements are met. Height of the bottom boss and the distance from the base-line to the flange seat are held by machining, with the casting located against the base surface. Machining removes flash at the parting and the 0.125-in. and 1.875-in. dimensions are held within the limits set. The remainder of the dimensions which carry less than plus or minus 0.010-in. tolerance are in the solid or same half of the die and can be held without machining. Thus the base-line chosen fulfills requirements and provides for minimum machining.

Cumulative tolerances that result when dimensions are given as in drawing No. 3 are often a source of trouble. The first ¼-in. hole, as here dimensioned, can come plus or minus 0.010-in. from the left end and the second ¼-in. plus or minus 0.015-in. from the end. Dimensioning each hole, as in No. 4, Fig. 14 from the base-line allows the die caster wider tolerance but meets the requirements.

Models: Models of parts to be die cast are frequently desirable. Visualization is facilitated greatly by constructing even a rough model of the casting needed, though one made to scale is still better. The model usually reveals one or more features of design that can be altered with profit by providing lower die or piece cost. Ordinary projection views show the part, as a rule, from only three positions while, with a model, it is easy to see how a die must be built to fit around it and how the part will be removed from the die.

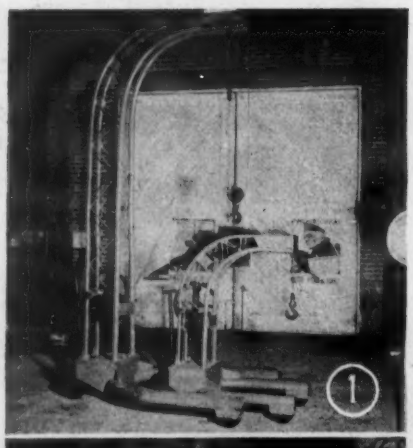
A model also helps greatly toward insuring the most attractive shape and contour of the casting. As eye appeal often favorably affects the sale of completed products, efforts to make die castings pleasing in appearance are well worthwhile. Products that are lacking in eye appeal are often improved through the co-operation of industrial designers or "stylists." As the nature, color and texture of finishes have a pronounced effect upon appearance, the advice of stylists may prove valuable.

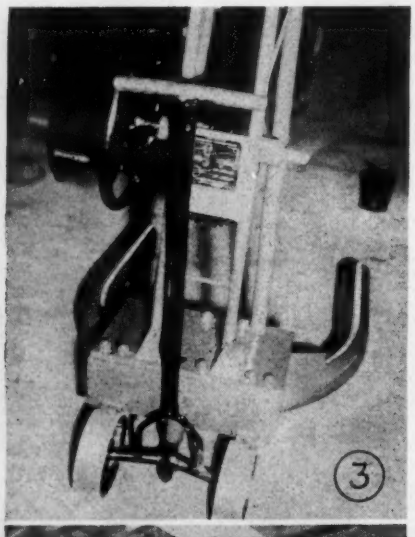
In all cases, however, working drawings should accompany the model so that essential dimensional limits are provided.

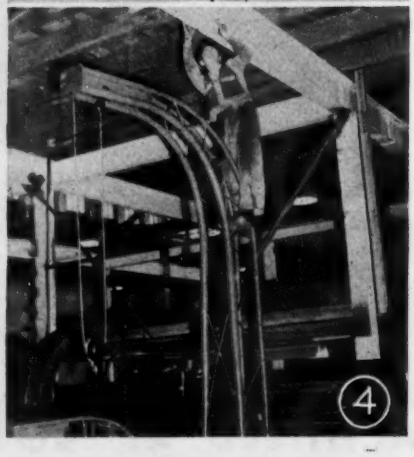
Selection of Alloy: The designer of die castings should choose that alloy which provides the properties needed and yields the lowest overall cost consistent with these requirements. Frequently this involves much study and sometimes makes it desirable to secure competitive bids on castings in two or more alloys. It should not be forgotten that the cost per casting, as produced, is frequently far from being the overall cost, ease and extent of machining and cost of finishing are likely to be important, as they frequently exceed the cost of the casting itself. Die cost and die life also require careful consideration as they vary widely and have considerable influence on machining and on finishing costs.

The die casting engineer should be consulted in selecting the type of alloy best suited for the job, and it is generally best to allow him to make the choice of alloy of a given base unless there are sufficient reasons for specifying a particular alloy. When there are standard specifications covering the alloy chosen, these specifications should be indicated.

PORTABLE CRANES . . . .







A USEFUL materials handling tool, the all-welded portable crane shown in accompanying illustrations, weighs less than one-half as much as the former model; is several times stronger and incorporates a number of features that were not possible with previous conventional construction methods.

Exemplifying the trend toward utilization of tubular members in welded designs for some types of machine structures, this crane unit has unusual benefits deriving from use of such shapes.

Crane is made in eight sizes, from 2000-lb capacity as shown at right in Fig. 1 to the 6000-lb capacity unit at left in Fig. 1. Small crane indicates the range of sizes.

By the use of welding, fabricating time was reduced by about 40 per cent, with a reduction in machining time of nearly 90 per cent over earlier type crane seen at left in Fig. 2, according to the manufacturer, Hill Acme Co., Cleveland. Although the two cranes shown here are both of 6000-lb capacity, the arc welded unit weighs 1375 lb less than the other one.

Material used in the latest design consists of a welded laced steel housing on a sturdy base of standard steel tubing.

Details of construction, as reported by Lincoln Electric Co., follow.

In the largest unit, 5-in. diameter formed tubing members are welded directly to a weld-fabricated box section of heavy-gage plate, as shown in Fig. 3.

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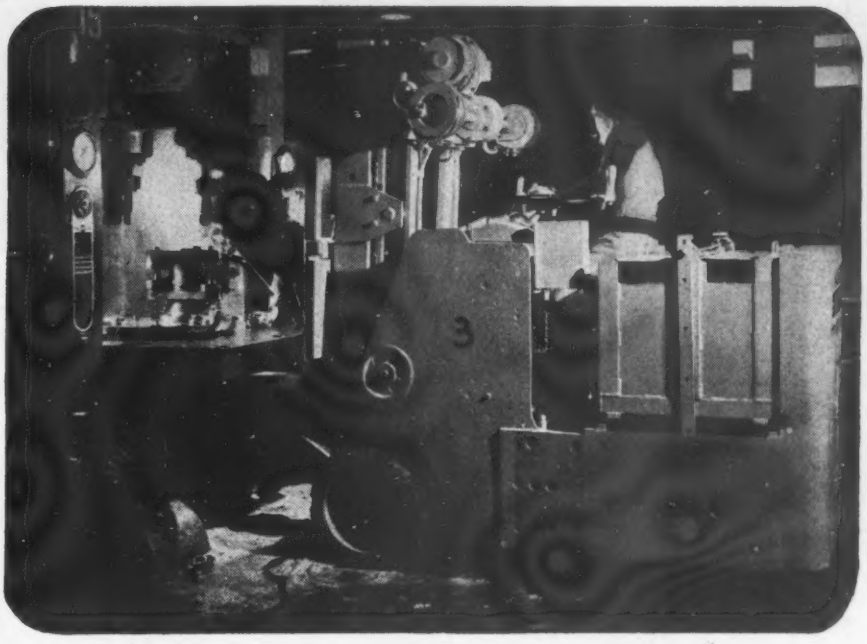

Changing the punch on the ram of this press is simplified by use of a fork-lift truck. New developments in handling methods appear regularly in STORAGE BATTERY POWER. Write for a sample copy if you do not already receive it.

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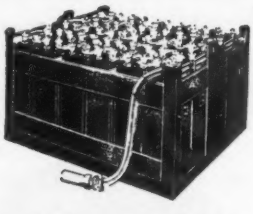

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- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.
- They can **stand idle indefinitely** without injury. Merely discharge, short-circuit, and store in a clean, dry place.
- They are **simple and easy to maintain.**

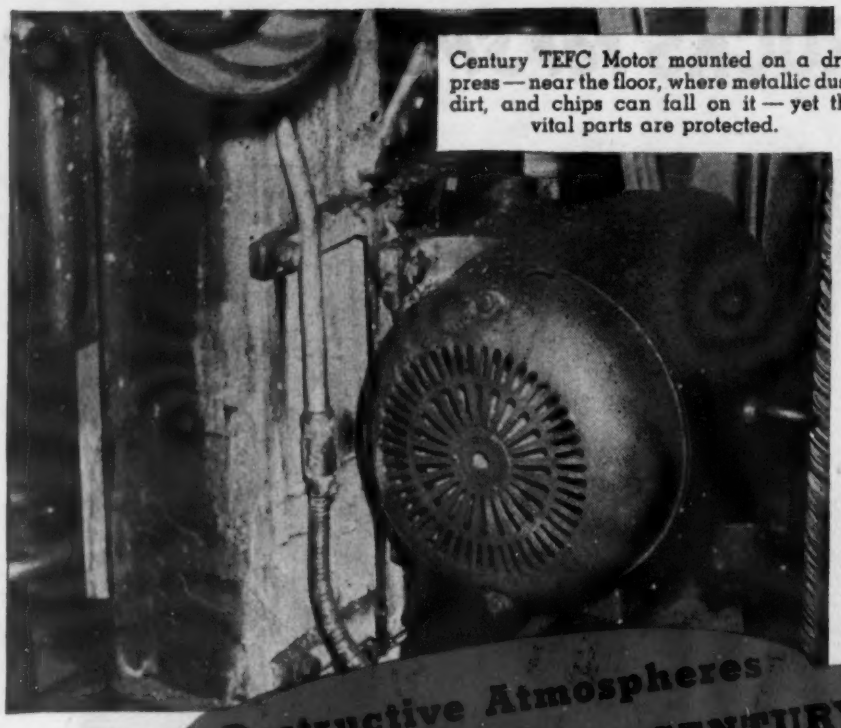
CHANGING large, heavy dies on huge production presses is one of the many handling operations that are being speeded up in numerous plants by means of battery industrial trucks. They enable one man to do the job of several in much less time, thereby increasing production efficiency of the presses. Further economies are effected by using the same trucks for storing idle dies in space-saving tiered racks.

A battery industrial truck has natural advantages for simplifying such handling jobs because of its superior maneuverability, high availability and dependable operation. Exchange batteries keep the truck continuously supplied with power. While one battery operates the truck, another is being charged. Except for the few minutes needed to exchange batteries, the truck need not stop for servicing its power unit. Its electric motor drives have a minimum of wearing parts; are inherently simple and trouble-free. The truck starts instantly; accelerates smoothly; operates quickly; gives off no fumes; consumes no power during stops. Not only does it make efficient use of power but the current used for battery charging is the lowest-cost power available.

Altogether, the battery industrial truck is one of the most dependable and economical types of handling equipment—especially when powered by Edison Alkaline Batteries. With steel cell construction, a solution that is a preservative of steel, and a fool-proof electrochemical principle of operation, they are the most durable, longest lived and most trouble-free of all batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.*

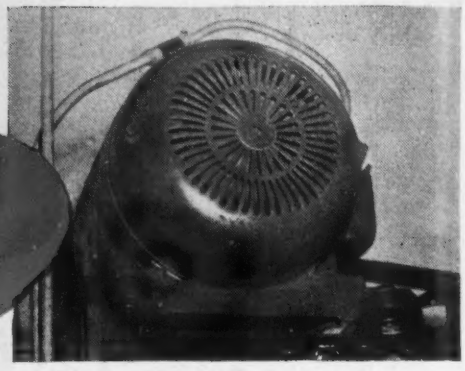
Edison
ALKALINE BATTERIES

160



Century TEFC Motor mounted on a drill press — near the floor, where metallic dust, dirt, and chips can fall on it — yet the vital parts are protected.

Century TEFC Motor mounted on a milling machine. Dirt on outside of fanguard is result of operation where air contains metallic dust and coolant spray.



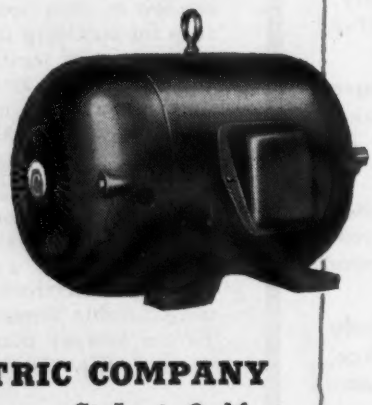
Century TEFC Motor mounted high on top of a boring machine. It's out of reach and probably gets little attention, yet protected against coolant mists and oil-laden dusts by Century TEFC design.

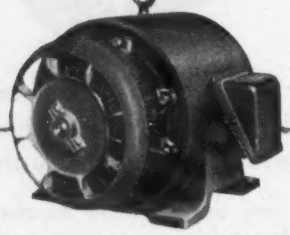
Destructive Atmospheres Require the Protection of CENTURY TOTALLY ENCLOSED FAN COOLED MOTORS!

The illustrations of Century TEFC Motors in use shown here are typical examples of machines on which these motors can maintain production despite adverse atmospheric conditions. Where the air is charged with substantial quantities of metallic or abrasive dusts, coolant mists, or oil-laden factory dusts, Century TEFC Motors give the protection that means constant uninterrupted production.

The vital parts of the motor are isolated from the outside atmosphere by a sealed inner frame. A large fan blows a blast of cooling air around the frame and the bearings — to keep the motor temperature well within safe operating limits.

For maximum protection that will keep your machines on the job, get all the facts about Century Totally Enclosed Fan Cooled Motors. Call in a Century engineer; he may be of assistance.





Century Totally Enclosed Fan Cooled Motor with the heavy, pressed steel fan cover removed.

Century Totally Enclosed Fan Cooled Motor End Bracket.

Century Totally Enclosed Fan Cooled Motor Frame and field winding showing the air passages.

CENTURY ELECTRIC COMPANY

1806 Pine St. • St. Louis 3, Mo.

Offices and Stock Points in Principal Cities

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The main vertical frame members are of 1½-in. stock, with the connecting braces of ½-in. hot-rolled round stock as shown. High stress points are amply supported by gusset plates welded directly to tubing itself and to large tubing and box section of base structure.

Several interesting design features are obtained with welded construction. The axle, hook and fork, for example, are drop forgings welded at the joints to form an automatic holding mechanism which holds the load at any point without using the conventional ratchet and pawl. The operation is controlled through a self-locking worm.

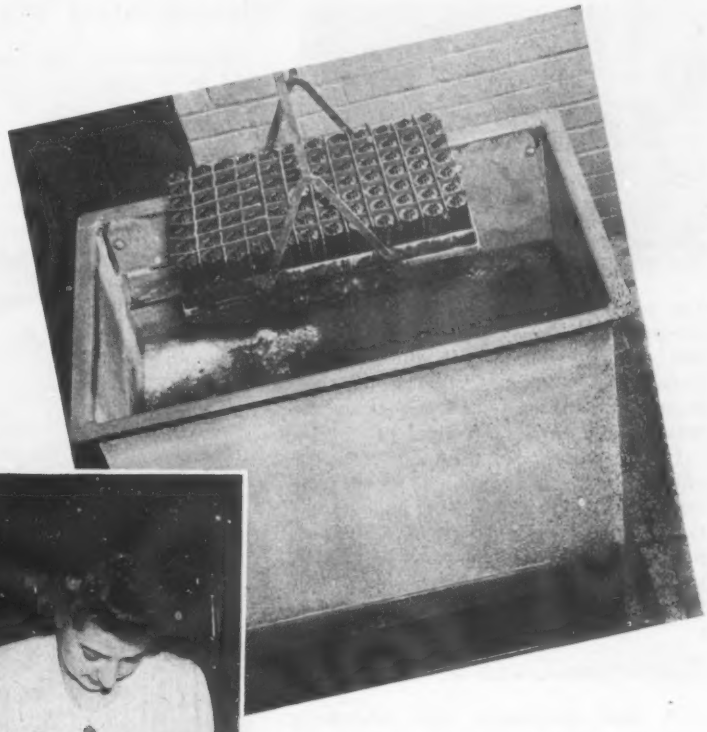
Fig. 3 also shows construction details of the welded handle and eccentric axle. This safety feature permits positive locking of the front wheels of the crane by merely positioning the handle upright as shown, thus protecting the operator and the load being lifted. When the handle is restored to pulling position, the wheels are released from the lock.

Another feature made possible by welded design permits the unit to be used as a portable, general utility ladder to obtain quick accessibility to overhead work as shown in Fig. 4. Horizontal connecting braces form ladder rungs on the upper structure and provide a good foot-hold for the workman.

Further simplification was obtained in the design of the hook block, now fabricated by arc welding several pieces of heavy-gage steel into one integral unit which measures 2½ in. wide by 7 in. long.

"GROWS" PARTS

To Desired Dimensions



Above—A tray of articulating rod pins for Pratt & Whitney 2000-hp aircraft engines built by Ford Motor Co. is lowered into a trichlorethylene bath containing about 50 lb of solid carbon dioxide (Dry Ice). Approximately 2 hr are required for completion of the "growing" process. Note spacers to protect finish of adjacent parts

Left—Here the articulating rod pins such as those "grown" in the chilling solution at 90°F below zero are being installed in an engine assembly by a bench worker in the aircraft engine building of the Ford Motor Co.

DIMENSIONAL increase or "growth" of hardened steel parts is used by the Ford Motor Co. in manufacturing close tolerance parts, especially those having critical-dimensioned carburized areas. This permanent expansion is accomplished by subjecting the parts to sub-zero temperatures for a period of time sufficient to allow complete transformation of any austenite that may have been retained after the usual heat treatment.

Liquid air and solid carbon dioxide (Dry Ice) are the most widely used mediums for chilling; however, the latter is more practical because of reduced handling hazards. To attain the minimum temperature with solidified carbon dioxide of approximately 90°F. below zero a vehicle or bath with a very low freezing point is used, such as alcohol, acetone, trichlorethylene, etc. Clean stock is immersed in this mixture. Cessation of violent effervescence in presence of Dry Ice indicates the stock has reached bath temperature, and the time element is measured from this point. Two hours is considered a minimum time. Longer periods of time and lower temperatures result in no appreciable benefits. A strain draw follows the completion of the chilling cycle, usually in oil.

Several factors are always considered when stock is to be manipulated through the chilling cycle. Aside from dimensions, surface finish protection is the most important. Since most parts requiring dimensional increase are highly finished, provisions are taken to protect each with suitable spacing while handling. Frost formation on the parts is prevented by warming treated stock in neutral oil (room temperature) to above 32°F. This is followed by immediate preservation measures and, finally, the oil draw.

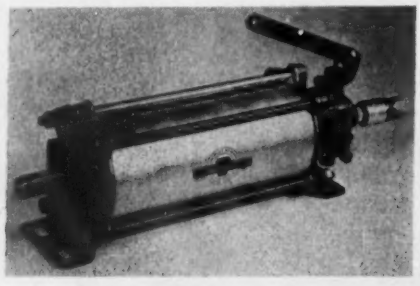
Limitations of this process are not at present known, however, experiments conducted by the Ford Motor Co. have been most successful with the carburized nickel alloy steels. Tests on highly tempered parts and stock subject to prolonged draw cycles indicate that opportunity to transform retained austenite in these cases is less frequent.

INDUSTRIAL EQUIPMENT

Air Motor

A new BM10 air motor introduced by Bellows Co., Akron 10, O., develops more than twice the piston thrust force of the standard BM5 motor on a given air line pressure.

The unit retains the same basic principle of integral valve, operating and speed controls found in the BM5. Motors are small, compact, powerful air-driven reciprocating power units. They operate on any air line pressure up to 175 lb.



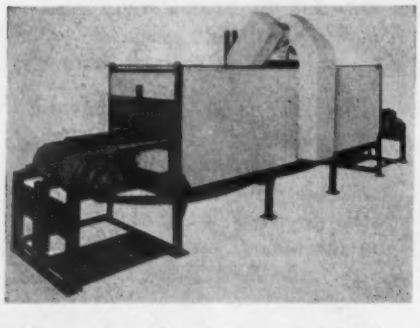
The valve and all operating controls are integral with cylinder, permitting full and positive control over all operating phases at all times. Only one air connection is required which may be either with flexible air hose or rigid piping.

Independant speed control valves provide precise and unlimited speed control of piston rod advance and retraction. Valve operating lever is adjustable to "any angle in any plane" permitting easy connection and ready synchronization to any reciprocating movement.

Conveyor Oven

A new continuous heat processing oven has been designed and built by Gehnrich Oven Division, W. S. Rockwell Co., 50 Church street, New York 7, which offers many combinations of drying, baking or heat treating operations with uniform heating.

Oven housing is built of Gehnrich patented insulated dual panel assembly

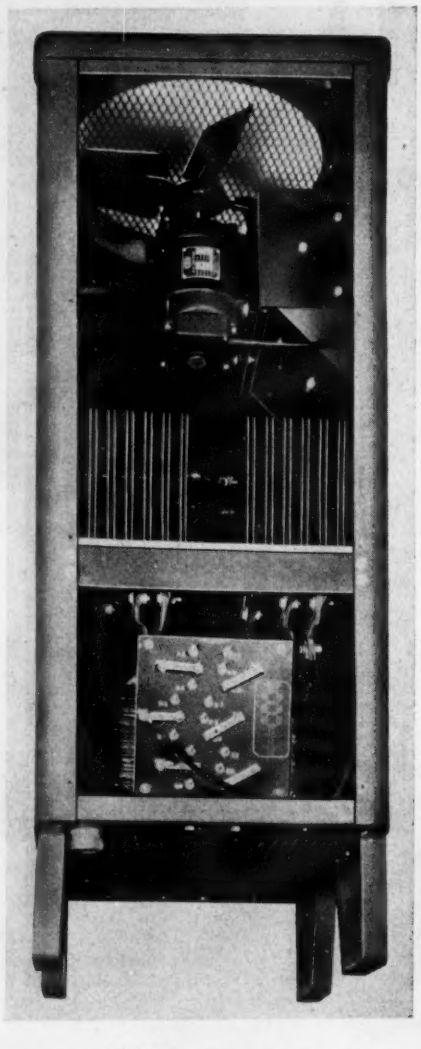


with no through metal or metal joints, minimizing heat losses. Electric heating elements are mounted in oven just below roof and a large motor-driven multiblade fan is mounted on roof. Heat from the elements is drawn through the fan into a vertical duct to bottom of oven and distributed evenly by louvers in oven floor upward through work moving on conveyor belts and up past electric heaters. If gas or steam heating is desired, heater and fan unit can be set on roof with same means for heat distribution and recirculation.

Each wire-mesh belt conveyor, running between angle guides, is provided with a speed reducer, roller chain and a variable speed pulley drive. One drive mechanism is mounted on bottom base at each end of oven.

Electroplating Unit

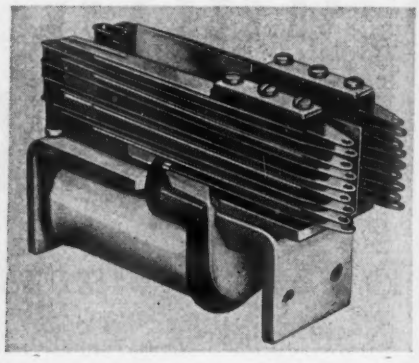
Udylite-Mallory rectoplaters, developed by Udylite Corp., Detroit 11, are available in two sizes. The senior rectoplater is built for an output of 1500 amp at 6 v or 750 amp at 12 v and is adaptable to most electroplating jobs. It features a ventilating grill at the top to permit close proximity to other equipment and a new exhaust type "directed ventilation" system which supplies cooling where needed. Accessible lubrication fittings are on the unit's two motor bearings. Improved fan motor suspension, increased junction area and an increased amperage output rating are also featured. It is housed in an all steel, electric welded cabinet.



Multicontact Relay

Type 20,000 relay specially applicable to signal, electronic and communication uses where minimum operating currents are important factors, is offered by R-B-M Mfg. Co., Division of Essex Wire Corp., Logansport, Ind. Contact spring assemblies of this relay can be provided in one, two or three stacks, with various combinations, up to 16 springs.

Coils are available in voltage ranges

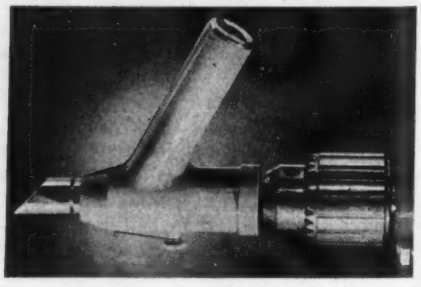


from 1½ to 28 v, dc. This type of relay is also available in two pole, double throw contact arrangement with current sensitive coil operating at 3.2 milliamps pickup and 1 to 1.5 milliamps dropout.

These devices are produced in two sizes: Standard, 4¾ in. long, 1 in. wide, and approximately 1¾-in. to 2½ in. high, depending upon contact spring assembly; intermediate, 3⅝-in. long, 1 in. wide and 1¾ in. to 2½ in. high.

Locating Device

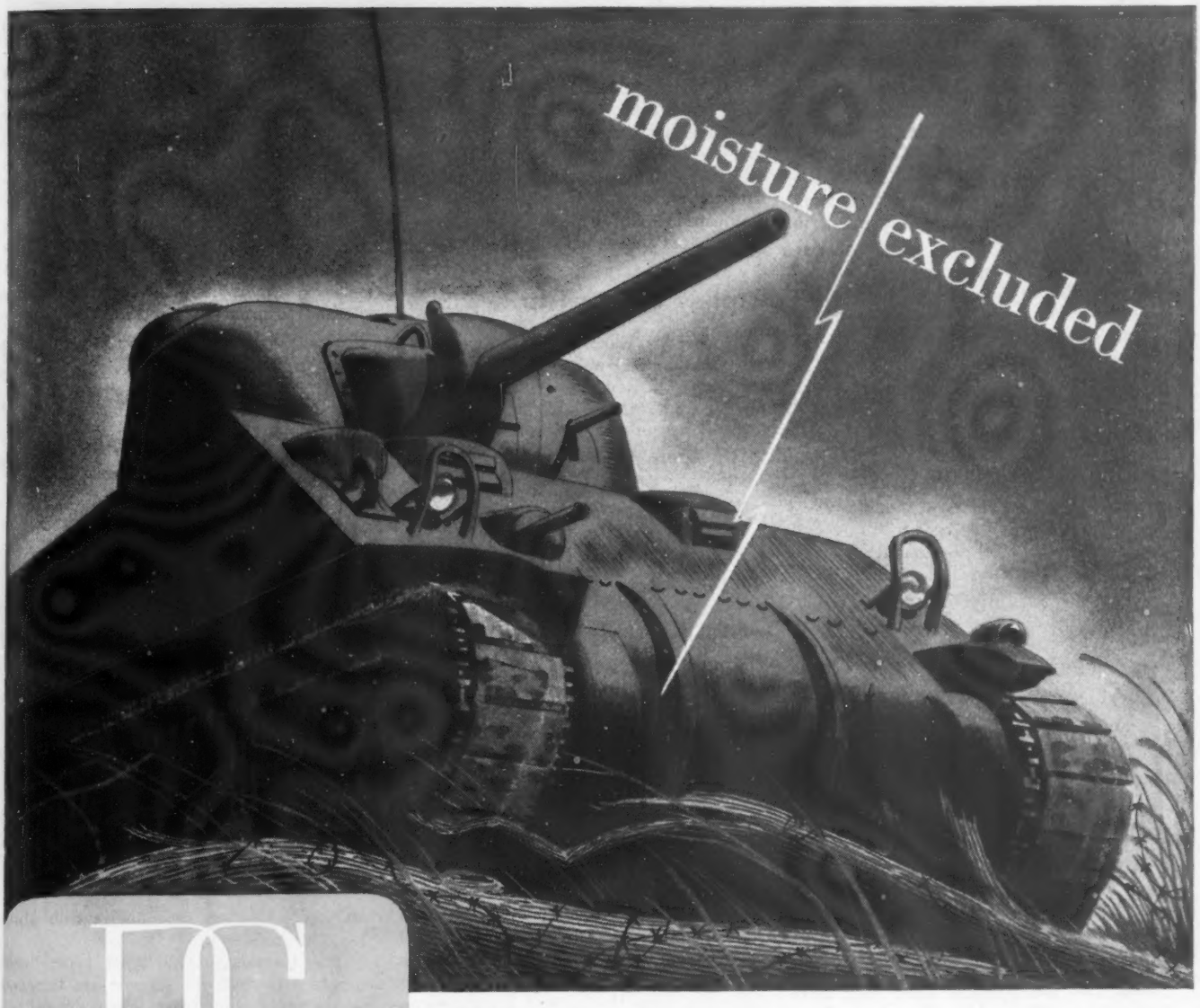
Designed to locate or center edges, lines or punch marks on a work-piece to the spindle axis of any machine tool, an optical locating and centering micro-



scope, known as Center Scope, is molded of gray Tenite plastic.

The device is injection molded of Tenite in four pieces. As the walls are rather thick and vary in their thickness, very close tolerances are held throughout and care is taken to prevent shrink-

(All claims are those of the manufacturer of the equipment being described)



DOW CORNING
SILICONES
TRADE-MARK

Dow Corning No. 4 Ignition Sealing Compound

In the heat of battle over miring terrain, the disconnect junctions of ignition and radar units are perfectly protected against failure by this *all-silicone* sealing compound. This same protection is provided to electrical equipment under the most humid plant conditions. Dow Corning No. 4 has the consistency of a soft grease, and neither melts nor hardens over the temperature range of —40°F. to 400°F.

Here is the assurance of uninterrupted performance —in a sealing compound having excellent dielectric properties . . . one that provides positive exclusion of moisture, permanent lubrication for insulated conductors, protection against vulcanization caused by overheating.

DOW CORNING CORPORATION
MIDLAND, MICHIGAN
ADDRESS ALL INQUIRIES TO BOX 592

Dow Corning No. 4 is in commercial production—one of a growing family of silicone products essential to the more successful, more economical functioning of electrical and other industrial and technical equipment.

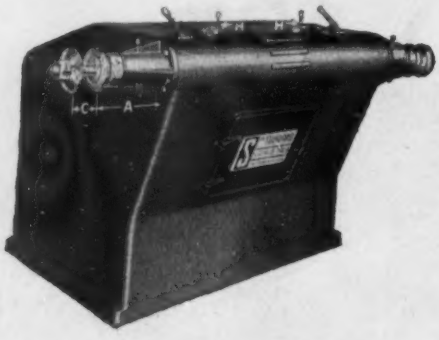
Dow Corning
FIRST IN SILICONES

ages which might interfere with precision of instrument. Plastic is molded over two metal parts: Shank which fits into a drill chuck or collet; tube at the bottom which guides and supports objective lens mount. Eye pieces and end piece are pressed into place. Mold is designed so than no bond lines appear on any of the pieces. Five holes necessary for adjusting instrument are drilled and tapped in plastic.

The Center Scope was molded by Modern Plastic Co., Los Angeles, for Center Scope Products, Glendale, Calif. Tenite used is a cellulose acetate butyrate product of Tennessee Eastman Corp., Kingsport, Tenn.

Buffing and Polishing Unit

Standard Electrical Tool Co., 2504 River road, Cincinnati 4, announces a new infinitely variable speed buffing and polishing machine, designated as type R2V. It is available in 5 and 7½ sizes. This machine is arranged with two sep-



arate spindles, two motors, two magnetic starters, two start-stop pushbutton stations, two hand brakes, each with coincidental switch, and two hand wheel indicator speed controls. Infinite speed range between 1500 and 3000 rpm is accomplished by turning hand wheel.

Each spindle is individually operated, permitting each workman to be independent of the other. Convenient spindle speed change permits polishing, coloring, buffing, etc., with the exact spindle speed required for each operation and as wheels wear, the speed may be increased for maintaining the desired peripheral speed.

Boiler Control Panel

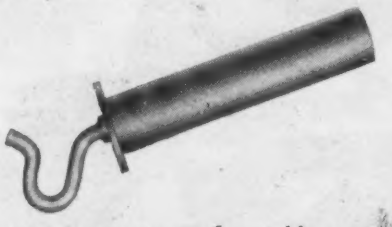
Prefabricated boiler control panels which include all necessary connecting piping and electrical wiring for operation of metering equipment and boiler control systems are offered by Bailey Meter Co., 1050 Ivanhoe road, Cleveland 10. These panels are factory fabricated and tested by experienced instrument mechanics. All piping and wiring necessary for operation is installed as a unit according to a co-ordinated and prearranged plan.

Small units such as valves, relays, switches, signal lights and the more sturdy and lightweight instruments are mounted and connected ready for service. Heavy instruments or instruments having delicate mechanisms are shipped separately; but cutout spaces, drilling and all necessary connections are provided so that their installation in the field is an easy operation.

Connecting piping and electrical wiring are brought to convenient terminals which are carefully tagged so that no time or effort is lost in connecting prefabricated boiler control panels to various factors which it controls.

Trolley Safety Tap

Mosebach Electric & Supply Co., 1170 Arlington avenue, Pittsburgh 2, announces a new Mesco trolley safety tap for underground use. It can be used



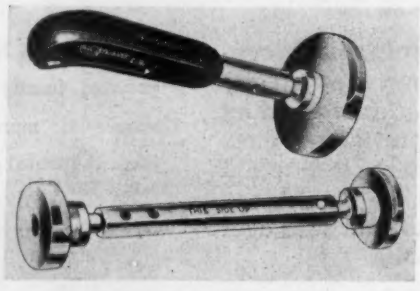
to operate any type of portable equipment beyond the trolley line.

Assembly consists of a copper hook attached to a bronze fuse receptacle and a similar fuse receptacle at the opposite end of the barrel, for attaching to cable connector. These assemblies are surrounded by an insulated tubular housing with fiber guard at hook end.

Checking Gage

Standard Gage Co. Inc., Poughkeepsie, N. Y., offers a new DuBo plug gage which is a checking gage of the fixed limit type. Small sizes from 0.240 to 1.510-in. in diameter, have the go and not go gaging members attached to opposite ends of a lightweight metal handle. Larger sizes, from 1.510 to 6.010-in. in diameter, are single end gages, individually mounted on palm fitting plastic handles.

Both types utilize a new color identification system. Go members of both double and single end gages are marked with a



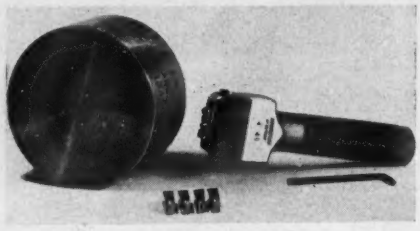
broad band of vivid green enamel under a durable, transparent plastic ring. Not go members are identified by brilliant red bands. Handles of the double end gages also carry corresponding dots of color.

Gage head is thin disk which is a section of sphere. Spherical gage surface makes contact with bore walls only at the instant and point of bore gaging. Two chamfered sections, diametrically opposed on each member, make it possible by slightly tilting handle, to enter the gage into bores easily.

Technique of using this gage is as follows: When checking a bore for lower limit, go member is entered in bore with handle held lightly between fingers and tilted slightly above axis of bore. Handle is lowered gently without pressure or force. If downward movement of handle is arrested, it indicates that bore is undersize at that point. If handle drops freely below axis of bore, it shows that bore is larger than lower limit. Same method is used in checking for upper limit, using the not go member. Gage is entered in same way. Arresting or dropping of handle clearly indicates whether bore is within or exceeds gage dimension.

Convex Marker

A new holder for marking part numbers, dates, serial numbers, etc., with steel stamps on the periphery of solid round stock is introduced by New Method Steel Stamps Inc., 147 Jos. Campau, Detroit 7. This convex marker is constructed so that it permits the stamping



of bars with their periphery rather than longitudinally.

The interchangeable steel type, held in place by two set screws, are tapered in such a fashion that when assembled in the type retaining mortise together with wedges, a predetermined radius is automatically formed by the sharp marking surfaces of the stamps. In the case of four character convex marker shown here, the stamps form a 2 in. radius for the marking of 4 in. bars. The individual type bottom, flat against a hardened steel anvil, thus insures impressions of equal depth and clarity for all characters by one blow of hammer.

The marker is of a semistandard design as devices having different radii and character capacity can be made to suit individual requirements. The handle of the holder is knurled for safe operation and tempered for long service under severe conditions.

Atmosphere Furnaces

W. S. Rockwell Co., New York, has developed a broad range of Kleen-metal oven-type protective atmosphere furnaces. These furnaces have been designed for temperatures between 1200 and 2400° F on heating operations such as bright annealing, silver or copper brazing, tool hardening, high speed steel hardening, scale-free hardening, nondecarburizing heating or sintering powdered metals.

These bath furnaces, substantially lined,

No STRINGS ATTACHED TO KENNAMETAL

The All-American Carbide

When you purchase and pay for Kennametal, *our proprietorship in it ends.* It is yours, to do with as you wish. You may use this tough, hard cemented carbide as the keen, durable cutting edge of economy-promoting tools, or insert it at critical points of a machine to minimize the effect of abrasive wear—*without entering into complicated agreements.*

If the use of Kennametal helps you perfect an invention—*the rights to that invention, insofar as we are concerned, are completely yours.* If the invention is patentable, we neither ask, nor want, an interest in your patent merely because Kennametal is a key component.

We have encouraged, and will continue to encourage, uninhibited use of Kennametal. The products shown on this page illustrate a few typical applications. The resourcefulness of America's designers and inventors will constantly bring forth new devices in which the incorporation of Kennametal is indispensable to provide wear-resistance up to 100 times that of steel.

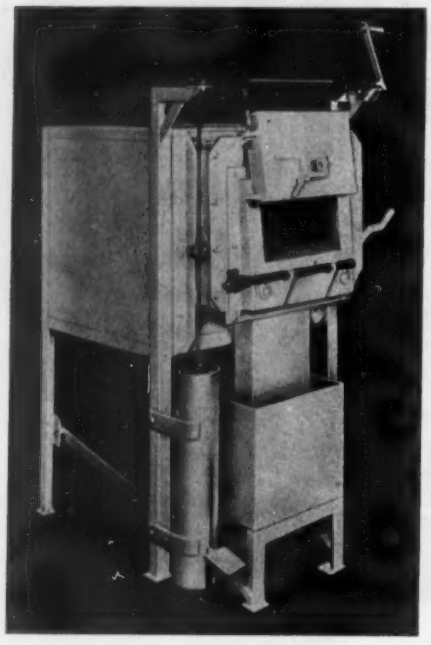
To these creative people, in whose minds the material progress of society first takes form and substance, we extend the fullest cooperation of our engineering and metallurgical staffs, and the reassurance that—*"There are no strings attached to Kennametal."*

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL *Inc.*, LATROBE, PA.

insulated and reinforced, are two types: (1) Those with carborundum or alloy muffles and (2) those which are heated directly. Muffle furnaces may be gas or oil fired; direct heated furnaces may be gas or electric. Both types are supplied with means for introducing prepared atmosphere gas from separate generators or cylinders, or for producing, for certain operation, the desired atmosphere from



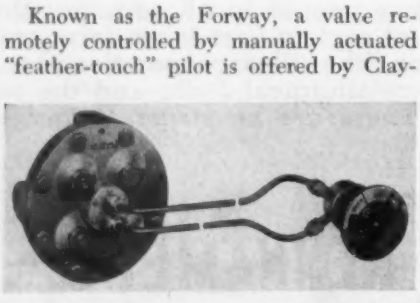
controlled combustion of gas in the combustion chamber of furnace.

For hardening and certain other heating operations, the long preheating chamber has a chute leading to a quench tank set in front of the furnace. For bright or clean annealing, brazing, sintering, etc., both muffle and direct heated furnaces are equipped with a water-jacketed cooling chamber for cooling the work in the protective atmosphere.

A self-sealing door inclined against the front plate of the furnace makes a tight contact to minimize heat and gas leakage. This door has a smaller swing-type door with a slight hole for observation of work. Under charging door (and the discharge door of the cooling section) there is a gas burner to provide a flame curtain which prevents air infiltration.

Four-Way Valve

Known as the Forway, a valve remotely controlled by manually actuated "feather-touch" pilot is offered by Clay-



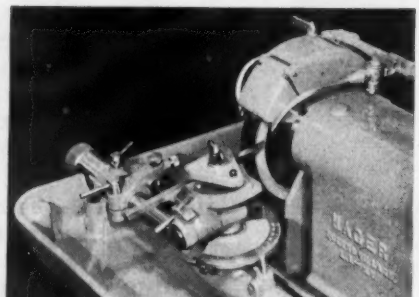
ton Mfg. Co., Alhambra, Calif. Hydraulic cylinder and fluid motor operations for many purposes can be controlled in a smooth, quiet and convenient manner. Control may be manual, electric or by float mechanisms, due to the flexibility of the pilot. Where it is necessary to restrict flow of pressure through the valve, limiting screws are available. Thus, rate of flow can be regulated to permit operation of equipment at a controlled rate of speed.

Carbide Tool Grinder

A carbide tool grinder which speeds up function of precision carbide tool grinding has been developed by E. F. Hager & Son, 98-02 217th Lane, Queens Village 9, L. I., N. Y. Based on fundamental principle employed in Swiss type grinder, this grinder grinds or laps, to a high degree of precision, carbide cutting tools for lathes and screw machines as well as tool bits with carbide tips inserted in milling cutters. All angles can be accurately rough and finish-ground or lapped on diamond wheels by mechanical settings.

Once the tool is clamped in the adjustable vise-like toolholder and set by built-in protractors for the cutting edge and clearance angles, uniform reciprocating action of tool across diamond wheel assures a keen edge and straight face on tool every time. After tool is locked in desired position, toolholder can be slid from rough grinding wheel to finish grinding wheel without removal from machine or changing angular settings.

Grinding spindle is precision ground

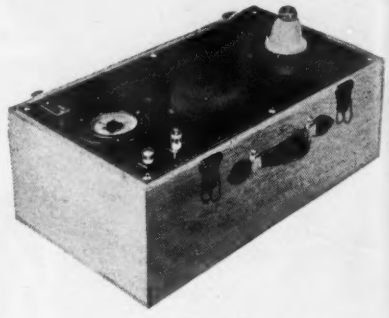


and supported on two felt-sealed precision ball bearings. Heavy center of spindle and rigidly constructed cabinet prevent vibration. Spindle speed of 3400 rpm is attained through a V-belt which transmits power from a ½-hp motor.

Toolholder is mounted on a hardened and precision ground shaft which pivots and slides axially in bronze bearings. Side movement is controlled by a micrometer adjusting unit reading in thousands located on left end of shaft. A compression spring mounted in a cup on other end of shaft causes a constant thrust against micrometer nut. Thrust ball bearings are mounted on either end of shaft to insure free pivoting. Pivoting motion of shaft is controlled by an adjustable stop arm which may be adjusted roughly by releasing lock screw and revolving arm about shaft. Fine adjustment is by a knurled thumb screw. Toolholder rest bar is provided, mounted parallel to pivot shaft. Coolant is pumped from one section of tank up riser pipe and through shutoff cocks to any of the four grinding faces of the wheels.

Portable Kilovoltmeter

Known as No. 759, a new portable Kilovoltmeter is offered by Shallcross Mfg. Co., Collingdale, Pa. This instrument has five ranges that provide 1,



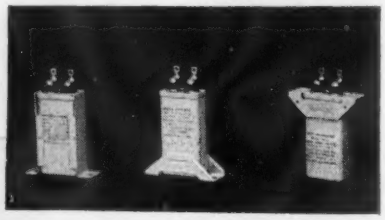
2, 5, 10 and 20 kv dc at full scale. Accuracy of the built-in meter is plus or minus 2 per cent.

New features include a reversing switch which makes it unnecessary to change connections to terminals of kilovoltmeter if polarity is reversed. Binding posts are available so that an external meter may be used if full scale accuracy better than 2 per cent is required. Resistance multiplier section is carefully adjusted within 0.1 per cent so that, if required, more accurate meters may be used with external connection. This also permits individual taps of multiplier to be used as accurate high resistance standards.

Paper-Dielectric Capacitors

General Electric Co., Schenectady, N. Y., announces a new line of hermetically sealed, fixed paper-dielectric capacitors with glass terminal insulators in case styles CP-60, 62 and 64, characteristics E and F. These units meet the requirements of the Proposed Joint Army-Navy Specification JAN-C-25 and are for use in combat communication equipment where severe operating conditions may be encountered.

Glass terminal seals are designed to



provide a high degree of resistance to humidity, fungus growths and termites. They are of construction which does not rely either on matched coefficients of expansion of glass and metal to resist thermal shock or on soft solder for mechanical strength.

All three case styles are available in both single section and two section construction.

Get the complete story on Macwhyte Slings

The benefit of our experience in supplying wire rope slings for industry everywhere is yours for the asking. Macwhyte Slings are custom-made to fit your particular needs. There are many types and assemblies—let us take care of your sling requirements.

We'll send you the complete story

Reliable safe loads and strengths on literally hundreds of slings are given you in the Macwhyte Sling Catalog S-7. Pictorial literature shows many ways of rigging up to handle loads safely. Just ask for Catalog S-7 and literature—send request on your company letterhead.

★ ★ ★ ★

MACWHYTE COMPANY

2912 FOURTEENTH AVENUE, KENOSHA, WISCONSIN

Manufacturers of the CORRECT wire rope for your equipment

Left & Right-Lay Braided Slings · Aircraft Tie-Rods
Aircraft Cable · "Safe-Lock" Swaged Terminals
Manufactured under U.S. and Foreign Patents

Mill Depots: New York · Pittsburgh · Chicago · Ft. Worth · Portland Seattle · San Francisco · Distributors throughout the U.S.A.

Member National Safety Council

NO. 811-S

Many types and assemblies

Macwhyte ATLAS Round Braided Slings (patented). 13 sizes in 10 different types. Made from two pieces of wire rope . . . one left lay and one right lay. These two ropes are spliced endless, folded to secure the required number of parts, and then braided. All ropes form a continuous uniform spiral throughout the entire length of the sling.

Macwhyte DREW Flat Braided Slings (patented). 13 sizes in 10 different types. The flat braided body is made from one rope spliced endless before the braiding operation.

Macwhyte MONARCH Single Part Slings. 20 sizes in 10 different types. Wire rope slings having a single part body.

Other Macwhyte Slings

Macwhyte also makes Grommets, Multiple Part Slings, Y-Guard Slings . . . and the Level-Lift Sling that keeps unbalanced loads level. Macwhyte Sling Engineers will cooperate in designing the proper slings for your plant.

Buy an EXTRA War Bond!

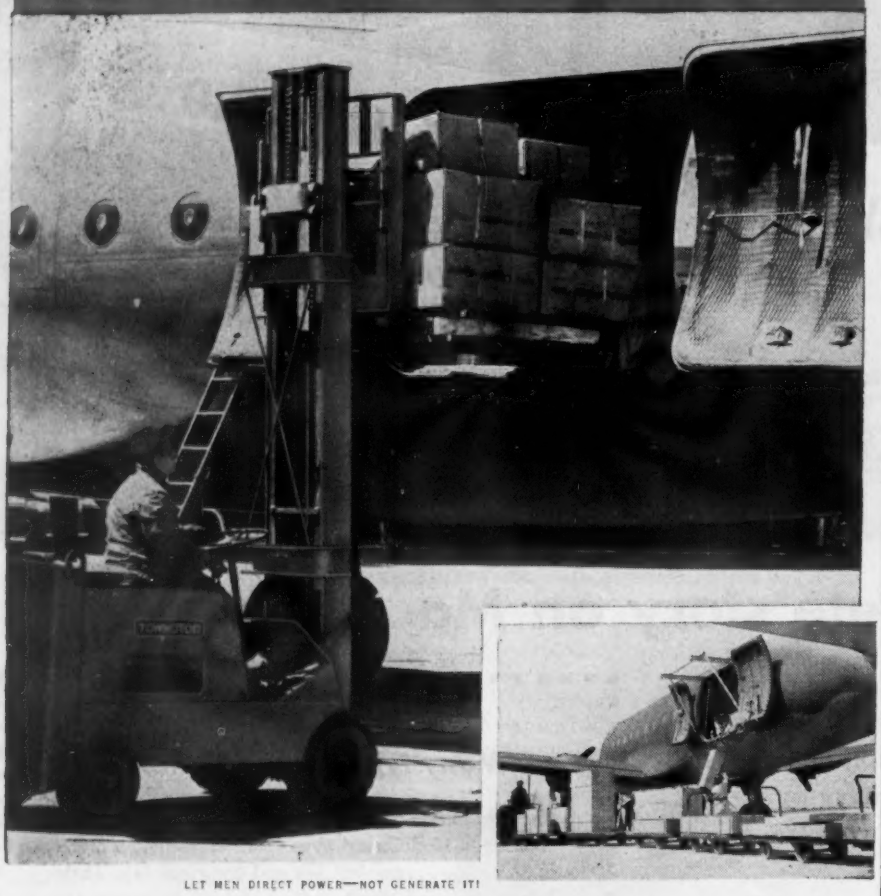
RIGHT-LAY **MACWHYTE SLINGS FOR INDUSTRY** LEFT-LAY

"Lifting safety to new heights"

Macwhyte Wire Rope Slings are made to meet the capacity of any crane built

HANDLING + Processing + HANDLING + Assembling + HANDLING
+ Packing + HANDLING + Storage + HANDLING

HANDLING—the Common Denominator of PRODUCTION



LET MEN DIRECT POWER—NOT GENERATE IT!

Effective distribution, the final phase of the production cycle, is predicated upon a good handling system. Distribution is concerned only with the finished product, representing the total cost of production, and is the end towards which all production efficiency is directed.

Flexible Towmotor, *the one-man-gang*, provides an effective aid to distribution that enables you to derive the full benefits of well-planned production. The Towmotor Material Handling Analysis Guide tells you how to develop a well-planned handling system. Write for your copy.

TOWMOTOR

THE ONE-MAN-GANG

TOWMOTOR CORPORATION • 1223 E. 152 ND STREET, CLEVELAND 10, OHIO

Press Stamping

(*Continued from Page* 80)

allows work to be pushed through dies in blanking operations.

The 4-way ram control valve is operated by a shipper rod which has adjustable collars so that ram travel can be limited to any amount between 1/32 and 6 in.

The pressure relief valve limits the pressure of fluid in the power cylinder, permitting close regulation of ram pressures to the work being done.

A dial type pressure gage, calibrated in tons and pounds per square inch, indicates at a glance the exact ram pressure being applied.

Conversion For Stamping: Before the Ypsilanti installation was made, samples of the work to be done were taken to the Denison Engineering Co., Columbus, makers of the Multipress. On a certain blank, calculations showed that a 10-ton press would be required. But by actually trying out the dies in a press at various settings, it was found that they would work okay at 5½ tons pressure. Accordingly three units were ordered. These were the standard 4-ton Multipress converted to 6-ton capacity by installation of a lower volume pump to afford higher pressures and by addition of the heavy strain rods shown in Fig. 4 to take the added load. This conversion was necessary because at that time the standard 6-ton Multipress was not yet available.

The 2-in. diameter ram is threaded internally for receiving tools. For stamping, a larger adapter head was installed on lower end of ram to facilitate attaching dies.

Since the units were to be operated on automatic continuous cycling service, they were furnished with the standard automatic cycling device and single control pedal, instead of hand levers. As long as the pedal is held down, the unit recycles automatically with this arrangement.

Addition of the heavy bolster plate also was found desirable in aiding smoother operation. The visitor to the Ypsilanti Machine & Tool plant is immediately impressed with the lack of noise that usually deafens one in a stamping plant. These units operate with comparatively little sound as there are no heavily loaded gears, bearings and other mechanical drives. Impact when dies strike the work is hardly noticeable due to the smooth hydraulic action.

Being able to adjust the stroke to the minimum required by the work at hand is an added safety feature. Power is conserved and speed gained also.

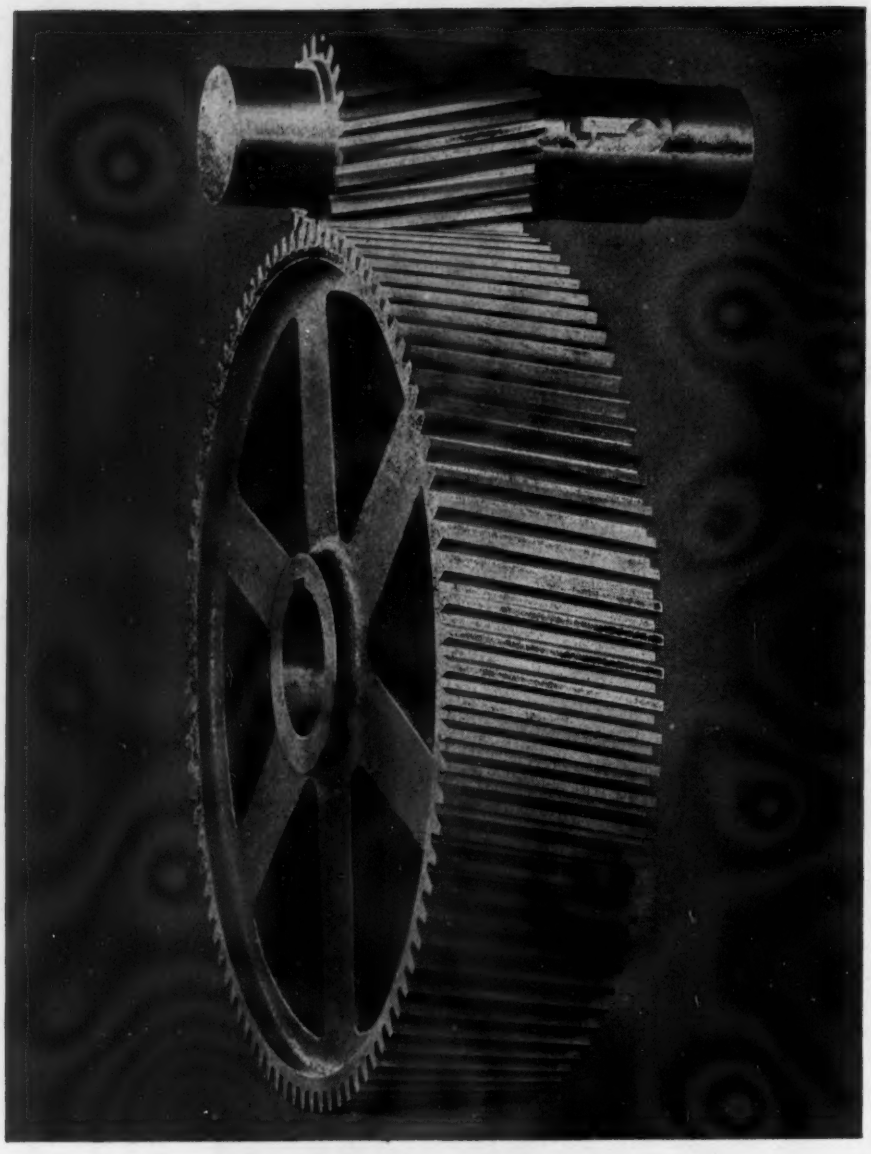
Low Investment: With cost of such a press converted as described well under $1000 and with die sets obtainable at from $500 to $1200, the complete installation of five presses and two of the best dies for each totals only about $17,000. With presses involving such a low investment, it is practicable to keep extra presses set up with dies all ready to go. Thus, in event of any difficulty

Advertisement

More production per man hour is being obtained in war plants using Niagara Power Squaring Shears. Convenient operation, quick, accurate setting of ball bearing, self-measuring parallel back gage, full visibility of cutting line, instant-acting Niagara sleeve clutch and complete accessibility at rear are some of their modern features. Built in a complete range of capacities and sizes. Write for specifications. Niagara Machine & Tool Works, Buffalo 11, N. Y. District Offices: Detroit, Cleveland, New York.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory regrinding service by the same skilled men who grind new Niagara knives.

BUY UNITED STATES WAR BONDS AND STAMPS



SMOOTH RUNNING HELICALS

★ Large or small . . . Horsburgh & Scott Helical Gears are doing a great job for industry because of their greater accuracy . . . greater resistance to wear. Six outstanding features make them most economical, quiet and smooth for transmitting power between parallel shafts . . . it will pay you to learn more about these popular Helicals.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

with dies or a press, another unit can be put into production instantly.

This was important here for production demands required operation on a continuous 24-hour schedule. The presses have worked this schedule satisfactorily since their installation in January, 1945, reports Mr. Tucker.

Setting Up A Job: When setting up a set of dies, the press can be operated with complete safety to dies and operator by setting the pressure relief valve to function at a low pressure. Then the shipper rod can be moved slowly to bleed the control valve slightly, affording extremely slow movement of the ram.

The pressure indicating dial also is valuable in setting up because it immediately indicates whether or not dies are clearing properly even before medium pressures have been built up in the dies.

Another important feature is that when a job is first set up and tried out, the amount of pressure involved in correct operation can be read from the indicator dial and the pressure relief valve set just above that figure. As the dies wear and become dull, the added pressure they then require will actuate the relief valve to reverse the downstroke of the ram thus automatically preventing the operator from blanking with dull dies. This is a valuable feature when maximum precision is required.

Use of the pressure relief valve in this manner also contributes greatly to safety and does much to remove stamping operations from the somewhat hazardous reputation they carry in some plants. If oversize stock is inadvertently placed in the dies, no damage is done for the pressure relief valve will function and reverse the ram automatically.

Similarly, if two pieces of stock get between the dies, or if a blanked piece happens to be carried under the dies along with the stock, the press will not jam or any other difficulty ensue because the relief valve will function before damaging pressures develop.

Certified Performance Offered in Wire Rope Slings

Wire rope slings accompanied by a Certificate of Test and Registry which furnishes a permanent record of original strength rating of sling, safety factor upon which rating was based, actual proof load, and conditions of sales are offered by American Chain and Cable Co., Inc., Bridgeport, Conn. Slings are made from preformed wire rope of improved plow steel. Terminals develop full strength of sling body and many slings will carry ACCO-Loc safety splice. Each sling carries a metal tag showing registry number, sling type, and maximum load rating. Among registered items are: Conventional wire rope slings, braided wire rope slings, and cable-laid slings. They are made with ACCO-Loc safety splice, armored loop ACCO-ULoc, Tru-Loc and socket terminals, which are said to develop 100 per cent rated wire rope strength.

SOUND · CLEAN · DEPENDABLE

DISSTON

STANDARD ALLOY STEEL

(INCLUDING NATIONAL EMERGENCY STEEL COMPOSITIONS)

AIRCRAFT QUALITY for Airplane Parts

GUN QUALITY for Gun Barrels, Rifle and Torpedo Parts

TOOL QUALITY for Cutting, Blanking and Forming

There are no finer steels than Disston Steels. All are sound, clean, uniform—thoroughly dependable in every way—and represent the latest developments in metallurgy and engineering. Each is made in accordance with modern steel practice... in electric furnaces... of carefully selected materials... with every process under accurate control and rigid supervision.

Consult Disston Engineers regarding your postwar plans

Back of Disston engineering service is the broad experience of one of America's leading makers of high quality alloy steels. This service has been profitably utilized by manufacturers in nearly all major lines of industry. It is available to you also, and without cost or obligation. You will find the services of Disston engineers specially valuable as an aid in working out your postwar plans. If you have a steel or cutting tool problem that is puzzling you, send full particulars to Disston. It will be carefully studied, and you will be advised frankly. Your communication will be held in strictest confidence.

HENRY DISSTON & SONS, INC., 726 Tacony, Philadelphia 35, Pa., U. S. A.

Drawing A.P. Shot

(*Concluded from Page* 100)

is protected from heat and fumes by special ventilating hoods and exhaust systems. In most plants, no operator is required at all as provision is made for automatically loading and unloading the furnace.

However, properly designed handling equipment enables the operator to load 250 pieces of 75-mm shot per hour, each piece weighing about 15 lb. Engineering does the heavy work, so the operator experiences minimum fatigue.

Fuel consumption here is held to a low figure. In actual operation, the cost of fuel proved to be 25 per cent lower than originally estimated. Economy of operation results from the efficiently designed heater, duct and recirculation system. While this particular unit is gas fired, similar furnaces utilize oil or electricity for heating. The working mechanism is built over a heavy all-welded structural frame to achieve maximum rigidity.

Controls are air operated and provide extremely accurate regulation of fuel input over a wide work range. Gas-air input is automatically proportioned and throttled to accommodate various production loads. Electronic safety controls afford complete protection from failure of pilot, conveyor motor, air or current.

While today such ovens are widely used for drawing, tempering and stress relieving various ordnance items, including cartridge links, clips and similar parts, they also can be used at lower temperatures for dehydrogenizing, Parkerizing and other such operations.

Platform Speeds Overhead Crane Rail Replacement

Through use of a "home-grown" platform, renewal of more than 6000 ft of crane rails 60 ft in the air was completed without accident in a building of the Glenn L. Martin Co., Middle River, near Baltimore, Md. Use of the platform also cut labor costs approximately 35 per cent under the original estimates.

Rails were located high up in B building, where seaplanes and transport ships were being built, and each 50-ft section of rail weighed 1250 lb. Work could be done only on Sundays, as the cranes were needed on week days.

A platform about 60 ft long and 4 ft wide was constructed with a welded steel truss built into it, and, as cranes which were to lift the platform were slung below the rails, the center section was built up several feet. By attaching 1500-lb sliding counterweights to the bottom, so that the apparatus standing on the floor resembled an inverted table with the counterweights themselves resting on the floor and their suspension supports extending some 10 ft into the air, the problem of tilting was solved. As platform was lifted, counterbalances resting on the floor prevented it from swinging. When counterbalances left the floor, the were suspended 10 ft below the pla form itself, preventing tilting as the me moved about.

It was found that 8 men could replac 200 ft of rails in a 9-hr shift withou danger to themselves, their tools, or th rails dropping on to the airplane part below. The platform was raised an clamped to the old rails, the hanger bol nuts loosened and taken off, and th splice plates removed. The entire plat form then was lowered to the floor, wit the rail resting on the truss. A new section of rail was clamped into plac on the truss and the platform raise into position at the top of the building Hanger bolts and splice plates were re placed, and another new section of rai was ready for the cranes.

Patent Numbers for Welding Library Sought

There are now more than 1000 books in the A. F. Davis Library at Ohio State University dealing with metallurgy, designing for welded construction, welding techniques and procedures, properties of welded metals, standard welded handbooks, welding magazines, original award studies of the James F. Lincoln Arc Welding Foundation, patents relating to welding, and many other subjects. Copies of more than 10,000 patents concerning welding equipment and patented applications of welding to products or structures are on file.

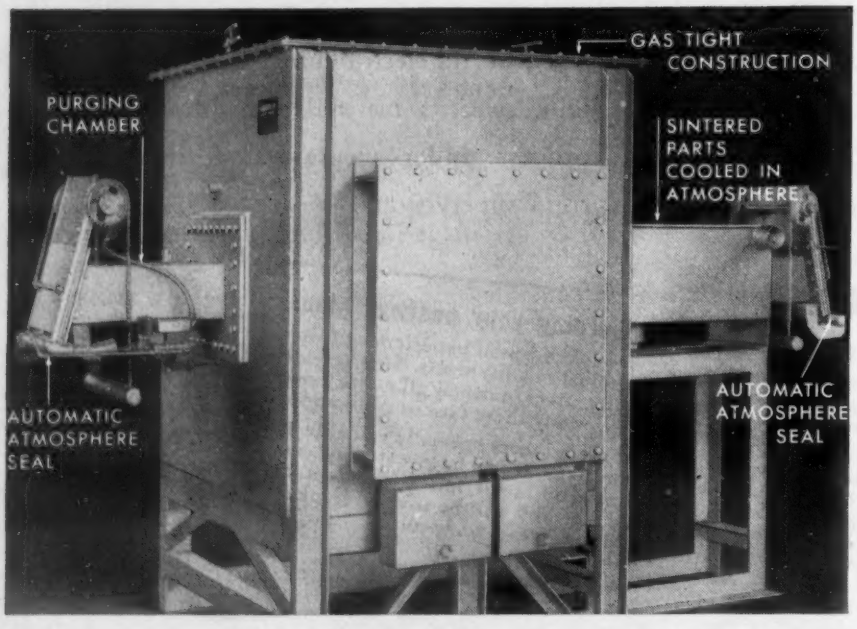
To make this collection complete, the industry and friends of the library are asked to send to the librarian any patent numbers pertaining to welding, welded equipment, welded machine design, welded structural design, or any welding application. As soon as war conditions permit, the collection of books and papers from foreign countries will be expanded.

Oil Spray Unit Prepares Engines for Storage

A machine which prepares aircraft engines for storage by introducing a fine spray of oil into the inside of the completely assembled engine, has been developed by Airplane Mfg. & Supply Division of Pacific Airmotive Corp., 6853 Lankershim boulevard, North Hollywood, Calif. Oil is heated by an immersion heater. Air is filtered through silica-gel contained in a separate pressure tank, assuring moisture-free dry air a working pressure of 30 lb of air. It is mounted on casters, making it portable. Unit, designated Model PA 787, requires 10 ft of electric cord for the oil heater and 10 ft of air hose for connecting to power and air supply, and 15 ft of air and oil hose with spray nozzle attached are provided. A bulletin giving complete data on this stand is available from the company.

Harper

FURNACES FOR POWDERED METALS



How to make Intricate Small Parts Quickly

Manufacturers are short-cutting production of intricate parts by sintering powdered metals in Harper continuous process furnaces. Harper design results in uniform quality of your product. Write for data.

HARPER
ELECTRIC FURNACE CORP.
1470 Buffalo Ave., Niagara Falls, N. Y.
Incorporated 1924

How to be sure of getting your MONEY'S WORTH

Right now there are some bargains in machine tools on the market. And there are some low-priced used machines for sale that are distinctly not bargains.

To be a good buy, anything you purchase should be worth more to you than the money you pay for it.

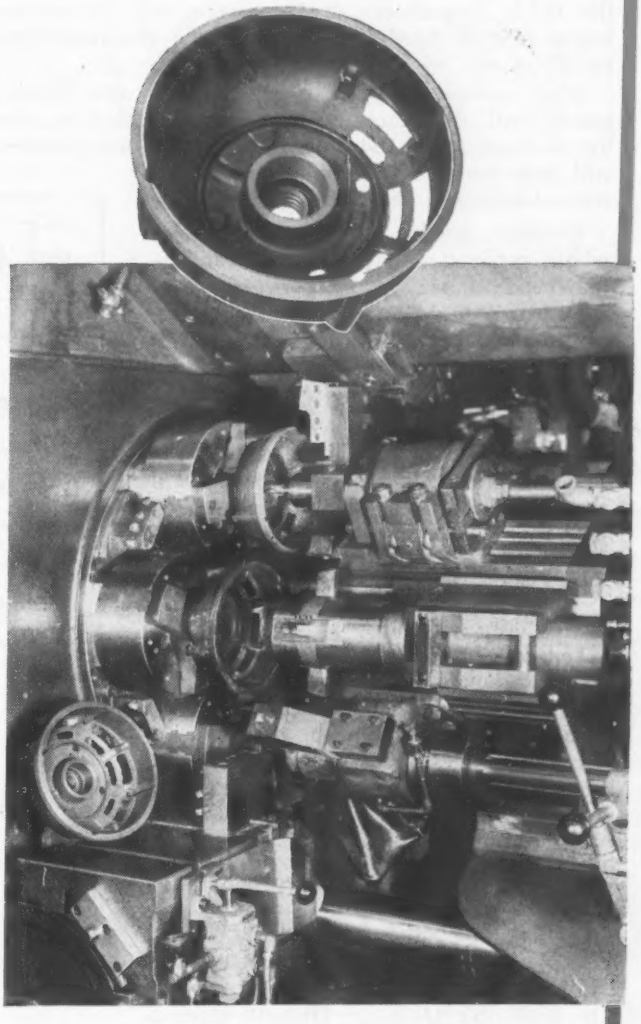
So far as used Acme-Gridley Bar Automatics are concerned, we suggest that you buy only on the basis of positive information as to the present condition of the machine and its adaptability to your production, regardless of age or model.

If the cost of the used Acme-Gridley, plus reconditioning and retooling costs, totals less than the cost of the same model new, chances are it is a good investment.

But be sure that a new model, even at higher cost, would not be a still better investment, because of its greater production ability.

We have a "cradle to grave" interest in all Acme-Gridleys—an interest in seeing that, old or new, they are profitable producers for their owners.

So we want you to feel free to call upon our experience in making your decision.



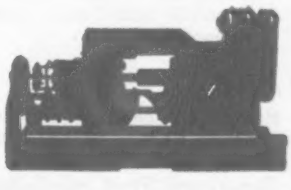
Sample of Low-Cost Production on a new Acme-Gridley 12" 6-spindle chucking machine. On this cast iron motor bracket, 10½" diameter, the 14 operations needed to finish the part were done with carbide-tipped tools in less than one minute machine time.

•

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO



THE BUSINESS TREND

Drop in Orders Presages Decline in Manufacturing

FURTHER decline in manufacturing in the next several months is presaged by a substantial drop in new orders placed with manufacturers.

Value of new orders received in May, according to the U. S. Department of Commerce, fell 15 per cent below that of April, the decline being the result principally of war contract terminations.

After declining rapidly since February, new business placed with manufacturers was down in May to about the level of May, 1944. Unfilled orders are, however, still large enough to provide a very substantial cushion.

Durable goods industries, most of whose production has been for war, experienced in May a 20 per cent drop from April in value of new orders received, while manufacturers of nondurable goods, which to a large extent are for civilian use, felt only a moderate decrease of 6 per cent.

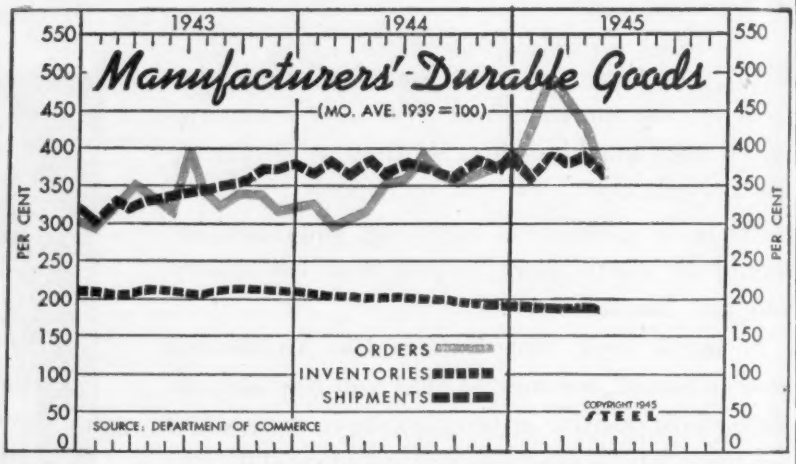
Continued substantial decreases in manufacturing might possibly be offset if the Army and Navy should demand accelerated production of munitions to finish the Japanese war quickly, now that Allied forces are closing in on the Jap homeland.

STEEL PRODUCTION—While a further general downtrend of industrial activity from an unprecedented high mark of a two-front war appears to be taking shape, current business activity is strong, with steel ingot production holding around 90 per cent of capacity.

WAR EXPENDITURES—A 3.4 per cent decline in war expenditures was registered in June when spending totaled $7,885,000,000, compared with $8,166,000,000 in May. Total war expenditures from July 1, 1940, through June, 1945, amount to $290,385,000,000. Highest expenditure of any one month of the war was in March, 1945, when $8,318,000,000 was disbursed.

MACHINE TOOLS—While preliminary reports indicate machine tool shipments in June amounted to $41,040,000, an increase of $1,215,000 over May, the value of new orders received decreased to $23,201,000 a decline of $2,997,000 or 11.4 per cent from May.

CONSTRUCTION—Activity in construction in the 37 states east of the Rocky mountains showed substantial gains in the first half of 1945 with privately-owned manufacturing building making a pronounced recovery. All major classifications of construction except residential building, which was down a little more than 3 per cent, showed gains over the first half of last year. Total of all construction contracts awarded in those 37 states in the first half of 1945 amounted to $1,482,399,000.



Index of Manufacturers' Durable Goods

(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
January	427	332	354	364	190	212
February	484	294	394	384	189	209
March	463	310	382	377	189	207
April	428	325	390	389	189	205
May	353	352	364	371	189	204
June	...	359	...	383	...	204
July	...	393	...	373	...	202
August	...	367	...	366	...	201
September	...	346	...	372	...	199
October	...	367	...	380	...	197
November	...	372	...	374	...	195
December	...	378	...	390	...	192
Average	...	350	...	377	..	202

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	90	90	90	97
Electric Power Distributed (million kilowatt hours)	4,385	4,295	4,358	4,381
Bituminous Coal Production (daily av.—1000 tons)	2,015	1,343	1,975	2,048
Petroleum Production (daily av.—1000 bbls.)	4,944	4,944	4,898	4,615
Construction Volume (ENR—unit $1,000,000)	$50.1	$49.0	$41.9	$36.1
Automobile and Truck Output (Ward's—number units)	18,080	16,500	19,490	19,545

*Dates on request.

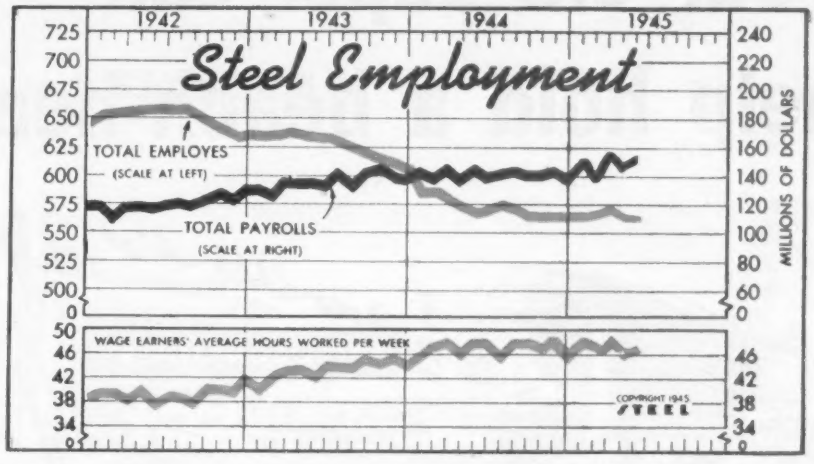
TRADE				
Freight Carloadings (unit—1000 cars)	882†	883	876	903
Business Failures (Dun & Bradstreet, number)	12	25	17	29
Money in Circulation (in millions of dollars)‡	$26,901	$26,932	$26,536	$22,531
Department Store Sales (change from like week a year ago)‡	+15%	+32%	+19%	+14%

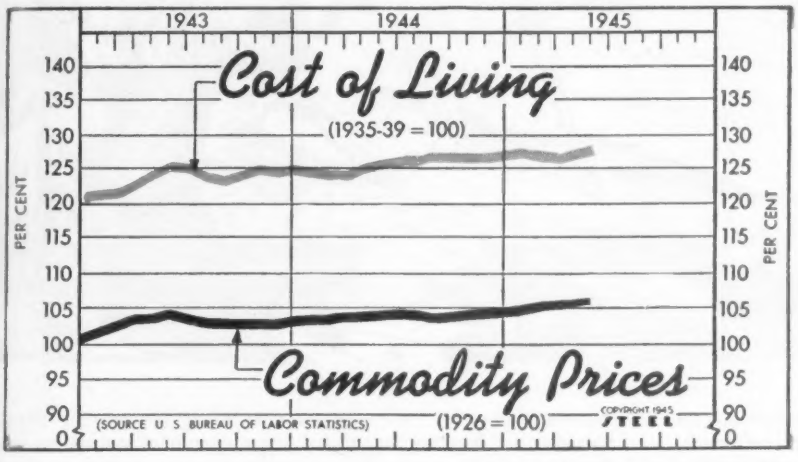
†Preliminary. ‡Federal Reserve Board.

Steel Employment

	Employes (000 omitted)			Total Payrolls (Unit—$1,000,000)		
	1945	1944†	1943	1945	1944	1943
Jan.	564	583	637	$150.3	$141.8	$129.7
Feb.	566	583	635	138.4	137.6	122.8
March	570	578	637	155.0	145.3	136.8
April	567	573	634	147.0	138.9	133.3
May	565	569	632	154.0	145.4	137.4
June	...	570	631	....	140.5	136.2
July	...	571	627	....	141.7	142.8
Aug.	...	569	625	....	143.9	139.9
Sept.	...	565	620	....	142.2	143.8
Oct.	...	564	615	....	147.7	144.9
Nov.	...	564	611	....	143.1	141.5
Dec.	...	564	605	....	139.9	140.2

† Monthly average; previous reports showed total number regardless of whether they worked one day or full month.





Wholesale Commodity Price—Cost of Living Indexes

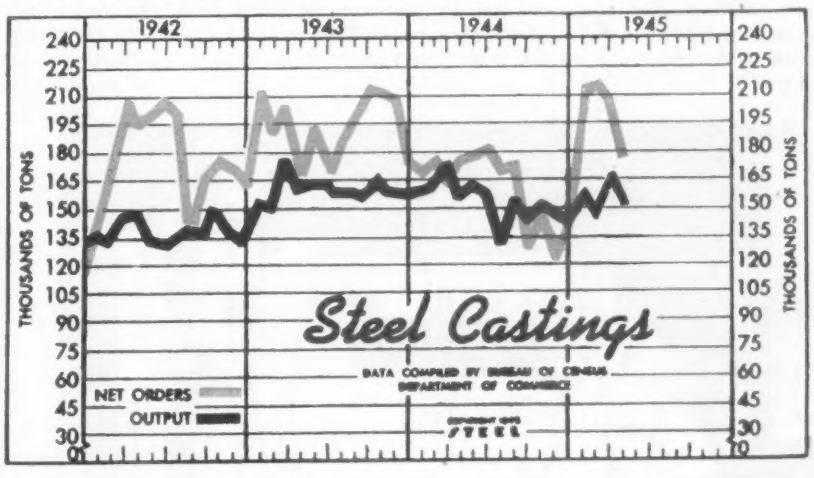
	Commodities (1926=100)			Living Cost (1935-39=100)		
	1945	1944	1943	1945	1944	1943
Jan.	104.9	103.3	101.9	127.1	124.2	120.6
Feb.	105.2	103.6	102.5	126.9	123.8	120.9
Mar.	105.3	103.8	103.4	126.8	123.8	122.8
Apr.	105.7	103.9	103.7	127.1	124.6	124.1
May	106.0	104.0	104.1	128.0	125.1	125.1
June	....	104.3	103.8	....	125.4	124.8
July	....	104.1	103.2	....	126.1	123.8
Aug.	....	103.9	103.1	....	126.4	123.2
Sept.	....	104.0	103.1	....	126.5	123.9
Oct.	....	104.1	103.0	....	126.5	124.4
Nov.	....	104.4	102.9	....	126.6	124.1
Dec.	....	104.7	103.2	....	127.0	124.4
Ave.	....	104.0	103.2	....	125.5	123.5

Commercial Steel Castings†

(Net tons in thousands)

	Orders		Production	
	1945	1944	1945	1944
Jan.	210.2	167.7	157.2	159.8
Feb.	214.4	173.6	146.2	161.4
Mar.	203.2	162.6	166.9	174.6
Apr.	177.7	175.1	150.3	155.8
May	....	177.0	....	161.8
June	....	181.8	....	157.4
July	....	169.9	....	131.9
Aug.	....	171.3	....	154.9
Sept.	....	129.8	....	144.5
Oct.	....	146.1	....	150.7
Nov.	....	120.7	....	146.4
Dec.	....	138.7	....	144.2
Total	....	159.5	....	153.6

† For sale.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,838	$11,648	$15,061	$11,026
Federal Gross Debt (billions)	$261.8	$261.6	$250.4	$208.6
Bond Volume, NYSE (millions)	$28.8	$27.8	$56.3	$52.4
Stocks Sales, NYSE (thousands)	5,229	4,478	10,088	7,510
Loans and Investments (billions)†	$64.2	$64.3	$58.9	$57.2
United States Gov't. Obligations Held (millions)†	$47,338	$47,122	$43,676	$41,917

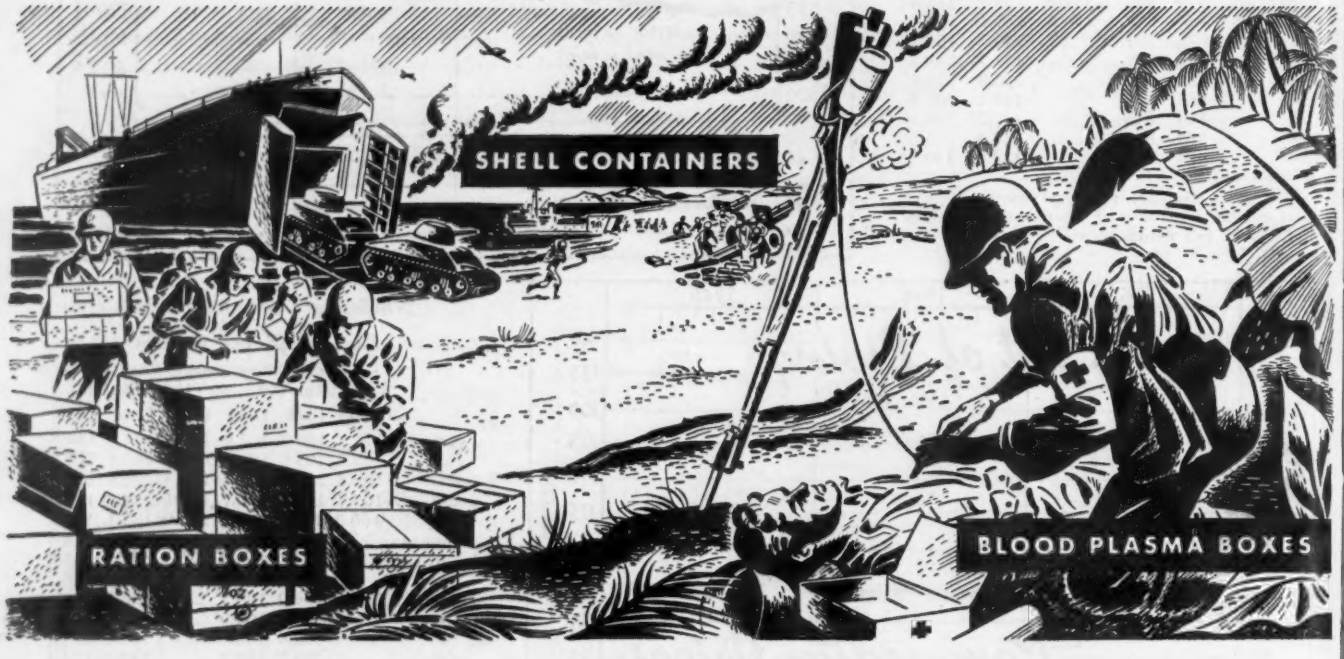
†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.6	105.8	106.0	103.9
Industrial Raw Materials†	117.6	118.3	119.0	113.9
Manufactured Products†	101.9	102.0	102.0	101.0

†Bureau of Labor's Index, 1926 = 100.

Your old paper can help hold a beach-head!



PAPER FOR THE PACIFIC! Every landing requires tons of supplies, most of which are paper-packed. Rations, medicines and munitions must often be *double*-wrapped for the tropics. None of this war paper comes back! That helps to explain why need for waste paper is today at an all-time high!

START A PAPER SALVAGE PROGRAM! If we are to supply the Armed Forces and meet your essential needs as well, we must save *more* and *more* paper out of *less* and *less*. See to it that a Paper Salvage Chief is appointed in your office, and that he has authority to clear waste paper out of dead files and store rooms.

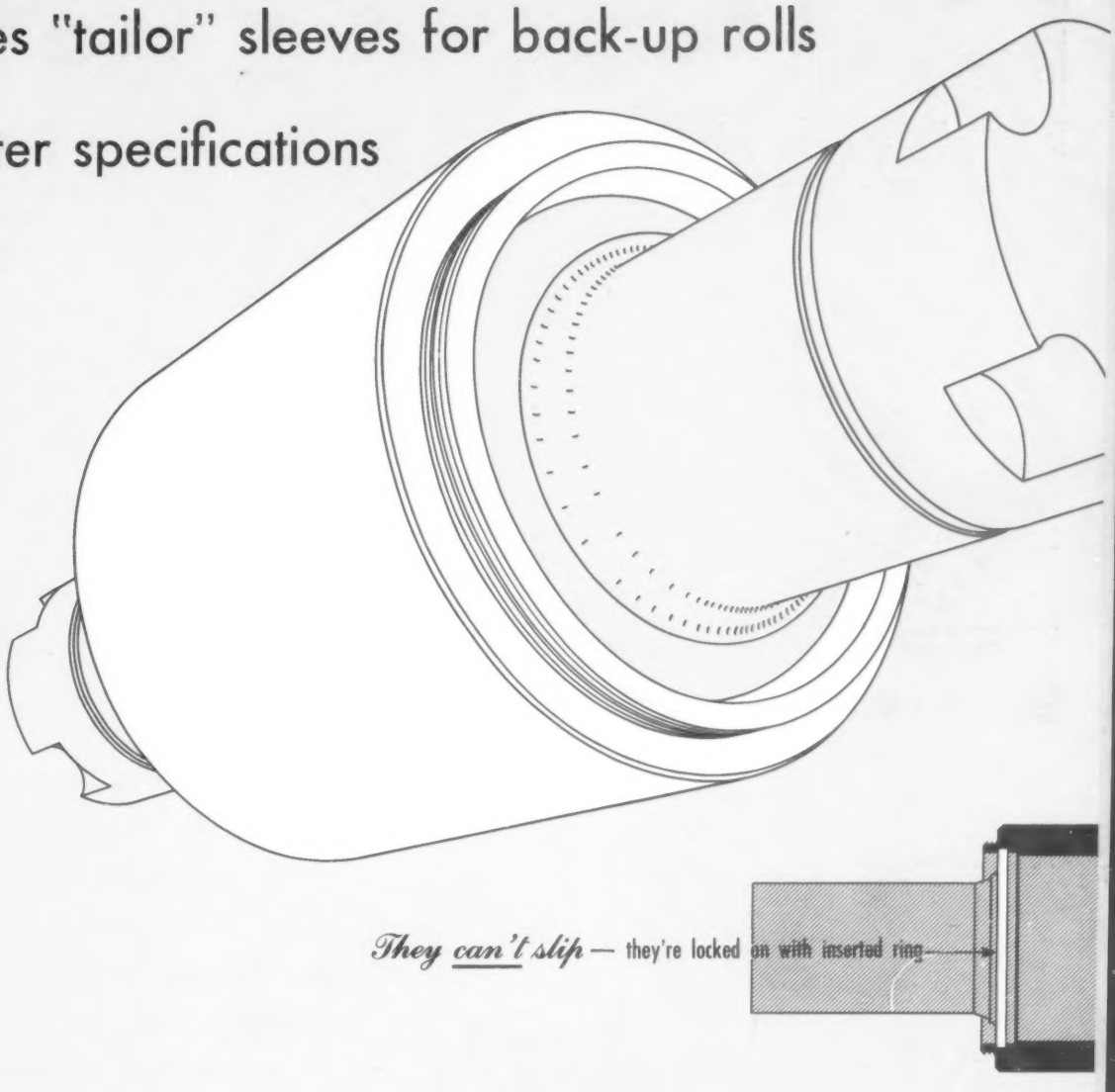
This advertisement prepared by the War Advertising Council in cooperation with the War Production Board and the Office of War Information. Space contributed to Double-V Waste Paper Program by this publication.

Separate and tie in bundles: 1. Waste-basket scraps. 2. Corrugated boxes, brown paper and bags. 3. Magazines and books. 4. Newspapers.

SAVE WASTE PAPER

V TO SPEED VICTORY
V TO AID VETERANS
OR LOCAL PROJECTS

Because **HEPPENSTALL** can and does "tailor" sleeves for back-up rolls to tighter specifications

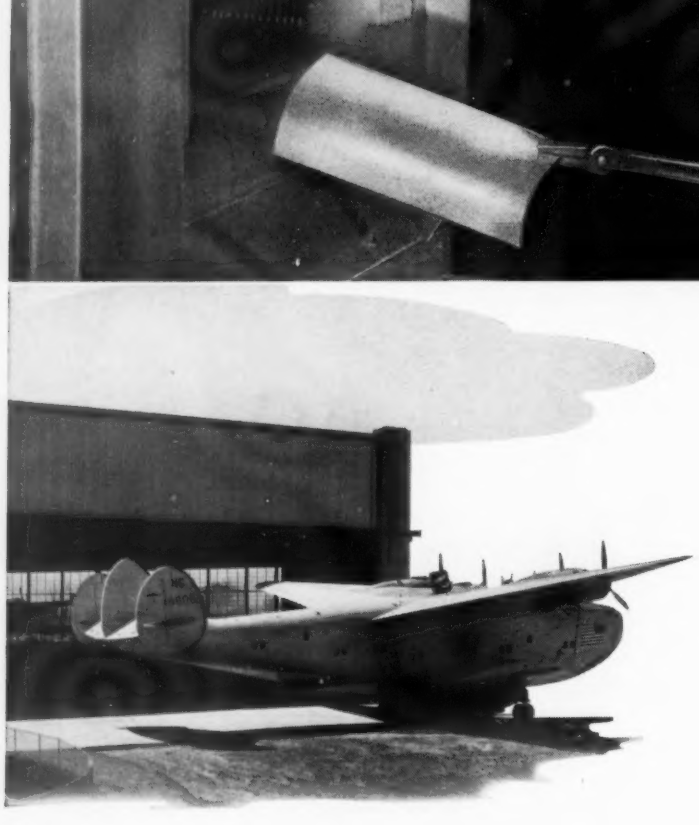


They can't slip — they're locked on with inserted ring

Here's one *definite* answer to reduced strip costs—Heppenstall back-up roll sleeves. Being a relatively small mass of metal with no necessity for the usual compromise between strength of necks and hardness of surface, these sleeves permit the incorporation of all Heppenstall's skill in metallurgy, forging and heat treating . . . and they can be furnished in any workable degree of hardness desired.

In all other respects, these sleeves are the *proved* equivalent of a solid roll *except*—they cost less, they last longer, and they eliminate the expense of scrapping a worn roll. If you would like to check their 15-year record of actual service in leading U.S. mills, write Heppenstall Co., Pittsburgh 1, Pa.

HEPPENSTALL, *The most dependable name in forgings*



Trans-Atlantic Clipper (built by Boeing) beached for servicing, La Guardia Field Hangars.

Pan American World Airways, at Marine Terminal—La Guardia Field, use, in almost constant service, a Hevi Duty 153012 Box Furnace to anneal aluminum alloy hull and wing pieces as well as miscellaneous steel assembly parts at temperatures ranging from 1000° to 1850° Fahrenheit. Flexibility of use of this furnace for many operations with accurate temperature control and heat distribution contributes largely to speedy round the clock servicing routine.

Send for Hevi Duty Box Furnace Bulletin HD-441

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

WPB Gains in Effort To Provide Reconversion Steel

Regulations revised to give better control . . . More cancellations reach mills but nearby deliveries are improved little

CLOSE control of steel is being maintained by War Production Board as the result of efforts by that agency, particularly in the scarce light flat products, sheets and strip. This is reflected in an increasing number of cancellations not ascribed to recent cutbacks in war orders.

These cancellations still are far from sweeping but represent loosening in tonnage that can be brought under Washington direction for application to needed purposes. Contributing to these cancellations is the recent revision of Direction 70, Regulation 1. This permitted steel originally allocated on war contracts to be used for civilian purposes and as first drawn applied to all Class A civilian-type end products. Recently this has been modified to apply to a limited number of products, principally construction machinery. This action is said to have been taken not only to eliminate certain abuses inherent in the order as originally written but to make it possible to channel steel for both military and civilian consumption.

Another recent ruling, Direction 76, Regulation 1, provides that consumers may not change allotment numbers on sheets and strip so as to substitute a rated order for one that has been cut back. These rulings and the order to reduce inventories from 60 to 45 days, with general rescreening of third and fourth quarter allocations, are beginning to open up some tonnage for purposes regarded by Washington as especially essential. On the other hand, there has been an easing in control of stainless steel sheets with recent open-ending of this product. Most producers, however, hold out little hope of shipment of unrated tonnage before November.

Steel production last week is estimated at 90½ per cent of capacity, an increase of ½-point from the preceding week. Pittsburgh gained 1 point to 87½ per cent, Chicago 1 point to 95, Cleveland 4½ points to 90½ and Buffalo 2 points to 90½ per cent. Wheeling declined 5 points to 91½ per cent, eastern Pennsylvania 1 point to 86, Cincinnati 4 points to 92 and St. Louis 2 points to 68. The remaining four districts were unchanged, Youngstown 90, Birmingham 95, New England 86 and Detroit 83.

Pig iron supply continues sufficient for needs, though there is no excess and no stocks are accumulated. Castings inquiries still exceed ability of foundries to accept and much needed tonnage can not be taken. Several blast furnaces down for repairs are nearing completion and are expected to resume production soon, which will relieve the shortage somewhat. An uncertainty in the future of pig iron is threat of shortage of coal, causing fear for supply of metallurgical coke for blast furnaces. Present indications are for a marked shortage and coke stocks are low, with little hope of building them up for winter.

Scrap is increasingly scarce, some dealers regarding the present situation the worst since the beginning of the war. The market is completely in the hands of sellers, with prices, except in a few instances, at ceiling for all grades, including borings and turnings. Consumers, only a few weeks ago out of the market and refusing offerings, now are seeking tonnage and are unable to obtain nearly as much as they need to support the present rate of steelmaking. As a result reserves are shrinking uncomfortably.

Some relief is offered steel warehouses in an amendment by Office of Price Administration allowing for upward adjustment of prices in individual cases on products on which mill prices were increased several weeks ago. Effective Aug. 1 warehouses, which have been absorbing the increases, may make showing that the mill advance has wiped out the warehouse spread or reduced the margin sufficiently to cause an operating loss, and justify their request for a higher price.

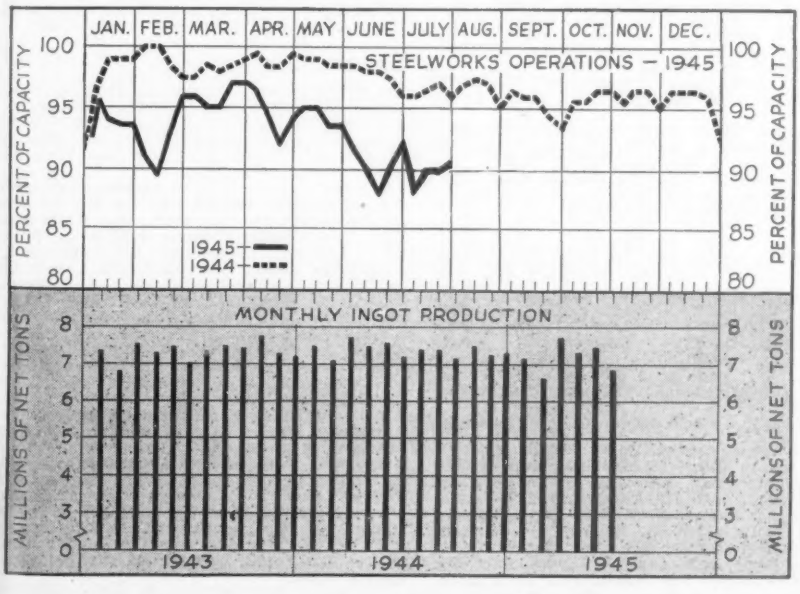
Average composite prices of steel and iron products remain firm at ceilings, finished steel composite at $58.27, semifinished steel at $37.80, steelmaking pig iron $24.05 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended July 28	Change	Same Week 1944	Same Week 1943
Pittsburgh	87.5	+1	90.5	99
Chicago	95	+1	100	98.5
Eastern Pa.	86	−1	95	93
Youngstown	90	None	95	98
Wheeling	91.5	−5	97	89
Cleveland	90.5	+4.5	96	96
Buffalo	90.5	+2	90.5	90.5
Birmingham	95	None	95	95
New England	86	None	90	97
Cincinnati	92	−4	52	86
St. Louis	68	−2	87	92
Detroit	83	None	83	89
Average	90.5	+0.5	*96	*98

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	July 28	July 21	July 14	One Month Ago June, 1945	Three Months Ago April, 1945	One Year Ago July, 1944	Five Years Ago July, 1940
Finished Steel	$58.27	$58.27	$58.27	$58.27	$57.55	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	36.45	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.07	19.17	19.17	18.65

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Averge for Last Month, Three Months and One Year Ago

Finished Material

	July 28, 1945	June, 1945	April, 1945	July, 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.15c	2.15c
Steel bars, Chicago	2.25	2.25	2.15	2.15
Steel bars, Philadelphia	2.57	2.57	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.20	2.10
Plates, Philadelphia	2.30	2.30	2.25	2.15
Plates, Chicago	2.25	2.25	2.20	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.80	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	34.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.15	2.15	2.00	2.00

Pig Iron

	July 28, 1945	June, 1945	April, 1945	July, 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Phila.	26.84	26.84	26.84	25.84
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap

Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.45	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$7.50	$7.50	$7.00	$7.00
Connellsville, foundry ovens	8.25	8.25	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bll. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lbs., $2.15. Do., over ⅜—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 8 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.75c
Spring wire 3.35c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports ..... $3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	⅜	34	16
¾	66½	55	1-1¼	38	18½
1-3	68½	57½	1½	37½	18
			2		

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2¾"	12	17.54	20.21	16.58	26.57
2⅞"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.98	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	28.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
7/16-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
7/16-inch and under	65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.30
Philadelphia, delivered	12.88

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945. †13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls., to jobbers	5.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (13 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[21]	4.715	6.012[28]	6.01[28]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	5.816[28]	5.86[28]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.75[21]	4.669	5.60[28]	5.75[28]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.65[21]	4.35	5.60[28]	5.75[28]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[15]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[15]	4.40[24]	3.75[21]	4.45[21]	5.60[28]	5.65[28]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[13]	4.500[24]	3.800[21]	4.659	5.93[28]	5.93[28]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.443[13]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[13]	4.475[24]	4.011[21]	4.711	6.10	6.10
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[15]	.....	.....	.....	.....	.....
Chicago (city)	3.30[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[28]	5.85[28]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[28]	6.087[28]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[28]	6.18[28]
St. Paul	3.76[3]	3.81[3]	3.81[3]	5.41[3]	3.51[3]	3.86[3]	3.86[3]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[28]	6.19[28]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[28]	6.231[28]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.908[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[26]	4.10[10]	3.65[23]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[13]	7.20[4]	5.588[13]	5.613	5.85[28]	5.95[28]
San Francisco	4.15[1]	4.35[1]	4.65[1]	6.35[1]	4.55[1]	4.50[1]	5.75[1]	6.35[15]	7.30[15]	5.333[21]	7.333	8.304[28]	8.404[28]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.533[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.783[21]	.....	.....	8.00[28]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.783[21]	.....	.....	8.00[28]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2349 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural)
Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.7

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — C	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 9, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	†21.38	†20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
†Pittsburgh, del.				
No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. ‡For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)			$30.50
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$34.00
Chicago, del.	37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$24.50
Valley base	24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, eorgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases	63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	32.90
Wire cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% l. gross ton, duty paid, $135; add 6 for packed c.l., $10 for ton, 13.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones: low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, cariot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, cariot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 2% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract cariots, $1.106, less cariots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; east: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, cariots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, cariot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, cariots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l. and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, cariots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, net less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.1% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferro titanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern contract basis, carloads in bulk, package, per lb. of alloy 14.00c, gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ¼ cent higher.

Simanal: (Approx. 20% each Si, Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 15 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No.1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	13.00-13.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Bornge, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	22.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	13.50-14.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.60
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	13.00-13.50
Short Shovel Turnings	15.50-16.00
Mixed Borings, Turn.	13.00-13.50
Cast Iron Borings	14.00-14.50
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	10.50-11.00
Short Shovel. Turnings	11.50-12.00
Cast Iron Borings	10.50-11.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50-10.7
Shoveling Turnings	11.0
Rerolling Rails	21.0
Steel Car Axles	21.50-22.0
Steel Rails, 3 ft.	21.5
Steel Angle Bars	21.0
Cast Iron Wheels	20.0
No. 1 Machinery Cast	20.0
Railroad Malleable	22.0
Breakable Cast	16.5
Stove Plate	19.0
Grate Bars	15.2
Brake Shoes	15.2
(Cast grades f.o.b. shipping point	
Stove Plate	18.0

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.5
No. 2 Heavy Melt. Steel	18.5
No. 1 Comp. Bundles	18.5
No. 2 Comp. Bundles	18.5
Machine Turnings	7.50- 8.0
Shoveling Turnings	9.50-10.0
Cast Iron Borings	9.50-10.0
Mixed Borings, Turnings	8.50- 9.0
No. 1 Cupola Cast	20.0
Breakable Cast	16.5
Low Phosphorus	21.00-21.5
Scrap Rails	20.50-21.0
Stove Plate	16.00-16.5

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.0
No. 2 Heavy Melt. Steel	13.0
No. 1, 2 Deal. Bundles	12.0
Machine Turnings	4.5
Mixed Borings, Turnings	4.0
No. 1 Cast	20.0

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.5
No. 2 Heavy Melt. Steel	14.5
No. 1 Busheling	15.5
No. 1, No. 2 Bundles	13.5
No. 3 Bundles	9.0
Machine Turnings	6.5
Billet, Forge Crops	15.5
Bar Crops, Plate	15.5
Cast Steel	15.5
Cut Structural, Plate, 1", under	18.0
Alloy-free Turnings	7.5
Tin Can Bundles	14.5
No. 2 Steel Wheels	16.0
Iron, Steel Axles	23.0
No. 2 Cast Steel	15.0
Uncut Frogs, Switches	16.0
Scrap Rails	16.0
Locomotive Tires	16.0

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97¼%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Symbol

OF GOOD FAITH

The R-S nameplate on an industrial furnace is an emblem of pride.

It is the culmination of careful metallurgical, thermal and mechanical calculations, honest effort and long experience.

It is a guide to fair dealing, an inspiration to confidence—a symbol of good faith.

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QUALITY PRODUCTS SINCE 1908

R-S Furnaces of Distinction

FURNACE DIVISION

R-S PRODUCTS CORPORATION

122 Berkley Street • Philadelphia 44, Penna.

BUY WAR BONDS

Sheets, Strip . . .

Sheet & Strip Prices, Page 134

Effect of war cancellations is not yet apparent in sheet mill order books, many consumers apparently holding their orders in the hope of using the steel in civilian work. Much unrated tonnage continues to come in but is simply filed, awaiting later rescheduling. Deliveries are not improved and backlogs extend far into the future. Little effect is noted from WPB efforts to remove duplicate orders and from reduction of allowable inventory.

Pittsburgh—Tight delivery situation in sheets and strip is indicated by the experience of a leading producer here whose shipments to date this month failed to match incoming rated tonnage on these items despite a downward trend of 15 per cent in bookings of all products compared with the like period during June. Chief reason why war contract cutbacks are not fully reflected on producers' order books is that many contractors are anxious to maintain their position on mill schedules, despite a drop in their war steel requirements, on the possibility that the tonnage can ge fitted into schedules and shipped for civilian goods account. Effort of WPB in weeding out duplicate orders and the lowering of inventory regulations has had little result on mill order backlogs. Sellers believe that the freeze order on September bookings will be lifted shortly.

A considerable volume of unrated tonnage continues to be accepted by producers, although at the rate of current cancellations it appears unlikely much of this tonnage can be shipped until late fourth quarter. It is acknowledged that a substantial amount of this unrated tonnage represents duplicate orders. Some sellers are discouraging wholesale acceptance of unrated business, while in at least one instance an active solicitation of these orders is under way. Some automotive tonnage is undoubtedly finding its way into rolling schedules but most sellers are doubtful that sufficient tonnage can be shipped to meet the 200,000 automobile assembly schedule established for the balance of this year.

Shipment of stainless steel for civilian account is not expected to occur on any large scale until late this year despite the fact manufacturers and steel warehouses are now permitted to place unrated orders. The industry has about a two-month order backlog of rated tonnage, and although incoming war orders have fallen off considerably, volume of this business is substantial. Producers are still required to submit melting schedule to WPB. The petroleum industry is absorbing a large portion of current output, while an additional substantial tonnage is shipped to the Tennessee Eastman plant at Kingsport, Tenn., for secret military operation.

Chicago—Sheetmakers continue to report extremely light cancellations following the recent moves of WPB to clear mill books of orders not now needed, because of war cutbacks. However, steel executives still feel it is too early for much of these canceled requirements to reach back to mill level. Automobile manufacturers have eased their pressure for sheets on unrated basis, finding such business can be accommodated for months to come. It is understood requirements are being met to some extent from inventories left over when car building

was halted and by location of scattered stocks in hands of warehouses. It is understood that the Army Quartermaster, Jeffersonville, Ind., is about to take bids on 13,900 field ranges for delivery between January and March, 1946.

Cincinnati—Backlogs of district sheet mills composed of rated tonnage, are less extended in cold-rolled, as the result of some cancellations and less aggressive new buying. Delivery promises in fourth quarter are now possible. Schedules for hot-rolled and galvanized, however, extend well into next year. Meanwhile unrated orders continue to accumulate for an unannounced volume. Only small tonnages of sheets, principally from stock accumulations, have been diverted to any manufacturers of civilian goods.

St. Louis—Pressure for sheet steel is increasing as labor shortage continues to limit production. At Granite City Steel Co. plant sheets are piling up outside the mill because of lack of finishers and loaders. Its Defense Plant Corp. furnaces continue shut down because of the labor situation and inability of the company and DPC to agree on rental terms. Virtually all sheet orders are under CMP. A recent burst of civilian inquiries is diminishing. Delivery on hot-rolled sheets is in March, cold-rolled in May, electric and galvanized in February.

New York—Sheet business here is irregular, although deliveries continue about as extended as a fortnight ago. Some sellers, in fact, are now quoting into second quarter of next year on hot-rolled pickled sheets, although better can be done, and on cold-rolled sheets some deliveries are available for as early as November. Open ending on stainless steel recently is tightening mill schedules on this grade, although most sellers have little to promise for shipment before October and November, except where over-runs and cancellations make better deliveries possible. There is still considerable unrated demand for hot and cold sheets, but sellers in most cases are accepting such business on a strictly tentative basis and hold out little hope for shipment this year.

War Production Board investigators are completing their survey of consumers of sheets and strip in this district, with respect to consumption, inventory and order position. Results will be forwarded to Washington shortly for analysis by the WPB Steel Division. This survey is being taken in an effort to ease the situation in these products.

Boston — Authorization of unrated orders for stainless sheets and strip finds mills generally filled with validated tonnage for third quarter. Minor volume of strip may be forthcoming if current rated schedules, in September with some producers, are subjected to revision; sheets are in November. That stainless will continue to be earmarked for more essential civilian goods is indicated by retention of checks on end-use and hot metal melt schedules, with 30-day lead time. Rated orders for carbon cold-rolled are slackening, but filling November schedules. While cancellations are slightly heavier, they are not yet sufficient materially to affect nearby deliveries with few openings. Fabricators seeking reconversion tonnage without allotments, in scattered cases are getting assistance for part of tonnage asked for, shopping around for the balance; some volume for typewriters is in this category, also

Rocker arms and bearing shafts last 2½ to 3 times as long when overlaid with

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Here's a successful solution to many maintenance problems

When the rocker arms and bearing shafts of a tilt oven began to show signs of wear, they were removed and the worn areas undercut ⅛". Using a 5/32" Ampco-Trode 250 weldrod, 3 passes were made to overlay the machined areas to the desired thickness. The parts were then machined and returned to service. Recent tests prove that the Ampco-Trode overlays provide strength, ductility, bearing and other physical qualities that surpass those of the parent metal.

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W-5

AMPCO-TRODE *Sampler*

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You get 5 grades and 3 sizes (⅛", 5/32", 3/16") of Ampco-Trode in the "Sampler" which will enable you to handle a wide variety of jobs. It's a regular $15 package that, as an introductory offer sells for only **$11.95**

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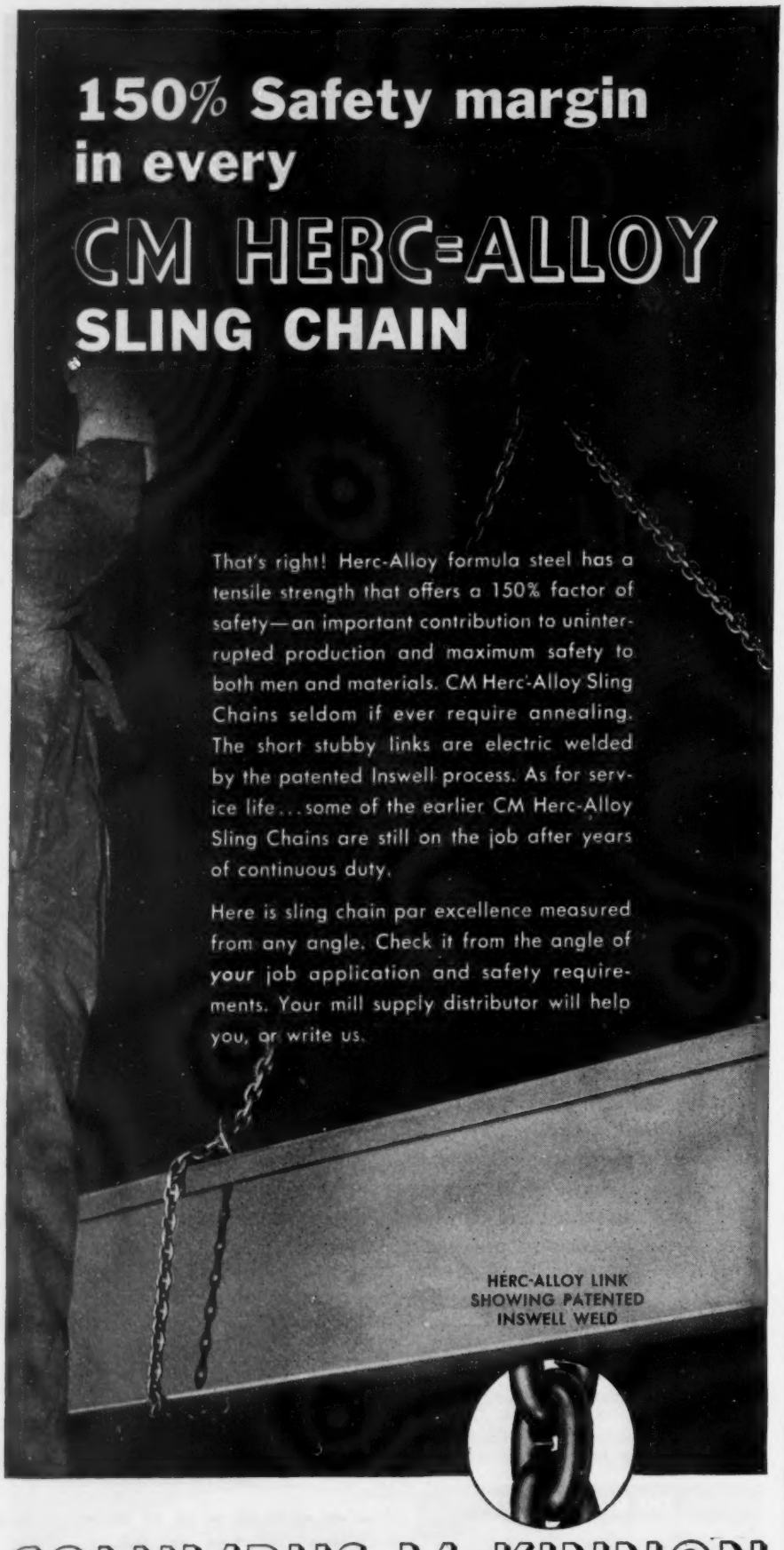

That's right! Herc-Alloy formula steel has a tensile strength that offers a 150% factor of safety—an important contribution to uninterrupted production and maximum safety to both men and materials. CM Herc-Alloy Sling Chains seldom if ever require annealing. The short stubby links are electric welded by the patented Inswell process. As for service life... some of the earlier CM Herc-Alloy Sling Chains are still on the job after years of continuous duty.

Here is sling chain par excellence measured from any angle. Check it from the angle of your job application and safety requirements. Your mill supply distributor will help you, or write us.

HERC-ALLOY LINK SHOWING PATENTED INSWELL WELD

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refrigerators and washers. Small manufacturers' orders, Z-3, trickle in. Reduction in the number of fabricated products for which sheets and strip originally allocated for war contracts, since cutback, can be used shows potential effect. Under direction 70, reg. 1, numerous civilian fabricated products similar to war goods for which steel was allocated were included. This held back cancellations at mill levels in cases where steel could be used for the fabrication of these products.

Buffalo—Improvement in manpower would do much to ease the present tight market in sheets and strip. Production of sheets at Bethlehem's Lackawanna plant is reported far below capacity because the mill is undermanned. It is hoped that WMC relaxation of regulations to permit a resumption of gate hiring will bring some relief. Unrated orders, both received and in inquiry stage, continue to mount, but top priority war work still commands most tonnage.

Philadelphia — New business continues to offset sheet cancellations in the Philadelphia district. However, there is not as much unrated inquiry as a month ago, probably due in a measure to fuller appreciation on the part of consumers of difficulty of obtaining rollings. Plain hot-rolled is available in November at some mills and also cold-rolled. However, most sellers are booked further than that and in hot-rolled pickled sheets and galvanized are filled well beyond. Several important producers quote second quarter on galvanized. Despite freer cancellations, the situation continues tight, with some new military requirements pressing, especially for the chemical warfare division. There is little likelihood of much unrated sheet tonnage being rolled in third quarter, nor for some time beyond, on the basis of the present outlook. Rated backlogs are still heavy and where there are cancellations within lead time, unrated tonnage cannot be substituted until after CMP carryovers from the preceding month have been cleared up, and all directives, all regular CMP orders and all Z orders. There still is a chance that some unvalidated carbon sheet tonnage in heavier gages may be rolled in the current quarter, due principally to former cutbacks in the landing mat program, but certainly little in lighter gages.

Steel Bars . . .

Bar Prices, Page 134

Larger bars continue difficult to buy, partially the result of needs for rockets. Delivery promises for late this year or early next are about the best that can be obtained. Some producers are booked into second quarter. Automobile requirements for forgings are bringing in considerable inquiry for unrated tonnage, some of which has received tentative promise for fourth quarter delivery. Greater effect of cutbacks is expected to be evident by September, thus improving probabilities for civilian use.

New York — Relatively, cold-drawn bars continue in most active demand here. Rocket requirements are still particularly heavy and it is difficult for consumers to obtain shipments for larger sizes required before late this year or early next. Hot carbon bar specifications are fairly sustained, with requirements diversified. There is considerable pres-

sure from forgers for unrated tonnage, reflecting particularly civilian automobile requirements. Some tentative promises on unrated tonnage have been made for fourth quarter. Hot-rolled alloy bars are available for August and September delivery, with unrated orders receiving attention.

Pittsburgh—Sellers have not been able to determine the full effect on bar mill schedules in shell and other war programs, as contractors have been slow in canceling orders. On the larger sizes of hot-topped quality steel items producers are booked into second quarter next year. Backlogs of plain carbon bars over one inch extend into December, with smaller diameters available somewhat earlier. Mills have been able to make only moderate headway against the large carryover tonnage, which factor, combined with steady influx of rated orders, makes it unlikely that any substantial tonnage on an unrated basis can be scheduled until late fourth quarter. However, some sellers believe that the full effects of recent and future war contract cancellations will reach the mill level by September, which would favorably alter prospects of increased output for civilian goods.

Cold-drawers report some falling off in overall order backlogs, but many have nothing to offer on larger sizes before December and January and are booked solidly through September in most instances. No rated tonnage of any consequence has been scheduled to date.

A $2 advance in cold-finished bar prices is expected soon by most producers to offset comparable price increase in hot-rolled bars granted earlier this year.

St. Louis—Merchant bar demand continues to taper as shell plant cutbacks go into effect. Production, however, has been reduced only by labor shortage, which is growing worse. Civilian orders are filling all capacity released by cancellations.

Boston—Buying of alloy bars holds better with warehouses than with mills. Producer deliveries continue to be promised for August. Carbon bar demand continues to slacken slightly. More buying by machinery and heavier equipment builders fails by far to balance loss of tonnage emanating from cutbacks in war contracts. Especially apparent in requirements for small arms, several Rhode Island shops are sharing in new nut and bolt contracts for the Navy. Carbon bar deliveries show improvement in spots and extension in deliveries on most sizes have for the most part stopped. This applies also to cold-drawn bars.

Philadelphia — The bar situation is fairly strong. Some spot openings are developing but in general most sellers of hot carbon bars quote shipments late in the year and beyond, especially in larger sizes, and on hot-top quality bars one producer quotes April on all sizes above 2 5/16 inches. Deliveries are definitely easier on some smaller and medium sizes of cold-drawn carbon bars. Due to cutbacks in small shells, one large producer quotes September, although offering shipments on diameters of two inches and larger and on small sizes late this year and in January.

Steel Plates . . .

Plate Prices, Page 135

While plate demand is fairly good, the general situation in this product con-

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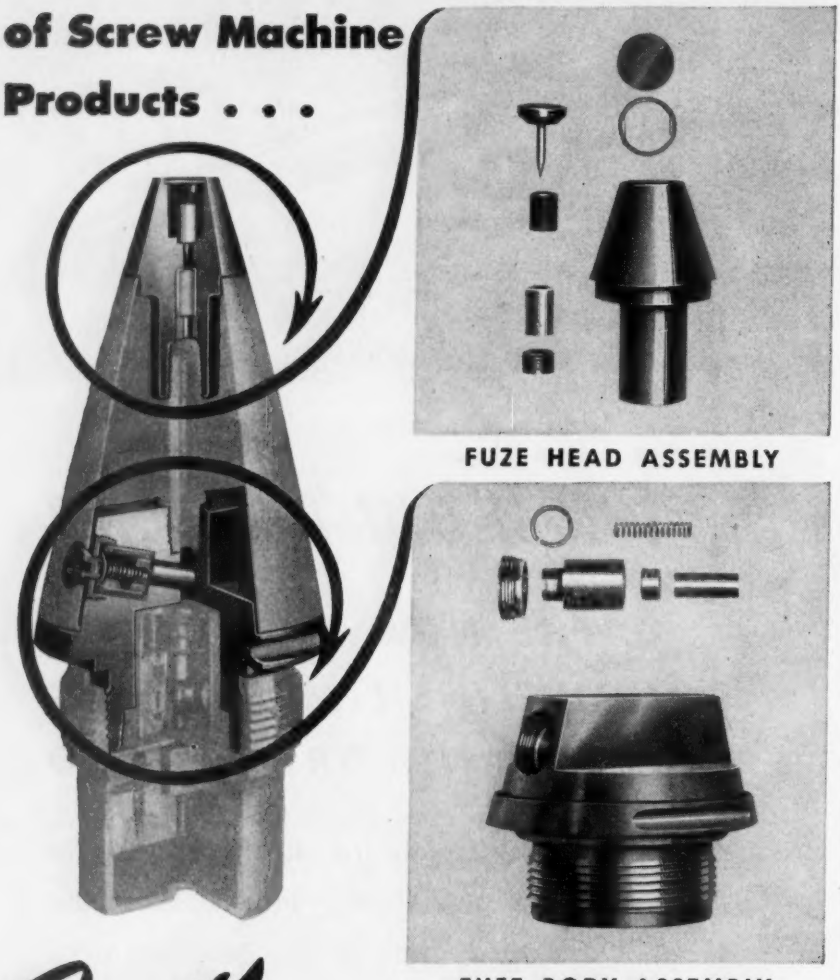

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tinues to ease steadily. Distribution of 130,000 tons of plates and shapes by the Navy for shipment before the end of August has strengthened the situation in some areas. Considerable inquiry for export is a factor, Sweden and Norway being in the market for much tonnage.

Chicago—Plate schedules of one maker in this district have been tightened up by a share of the nearly 130,000 tons of plates and structurals which the Navy placed under directive about ten days ago. End use of the material is not known, except that it is for the Pacific, but it must be made and shipped before the end of August. In the main, the plate load of mills is descending, but is increased occasionally by directives and rated orders.

New York — Plate demand is fairly brisk, comprising principally unrated tonnage. Jobbers are specifying freely to meet various spot demands which continue to come out, chiefly for ship repairs and reconversion work. Substantial oil refinery tonnage is reported under negotiation.

In addition substantial tonnages are pending for export, for Sweden and Norway in particular, with some business already placed. Sweden has one considerable inquiry out, calling for delivery over the next two or three years. Requirements are principally for ship work. In addition this country is inquiring for other steel building materials, such as shapes, [illegible] and some sheets.

The Royal Norwegian Purchasing Agency, Royal Northern Ministry of Supply and Reconstruction, is in the market at present for 30,000 tons of plates, sheets of various descriptions and plate bars. This agency represents a purchasing pool, covering the requirements of various individual consumers in that country. It is expected to cover Norwegian purchases until the end of this year, at which time it is hoped that conditions, especially monetary conditions, will have become stabilized to the extent that purchases can be conducted along normal lines by the individual consumers. Steel purchased thus far by Norway has been bought at full export ceiling levels, in contrast with steel being purchased for France at domestic levels under lend-lease arrangement. The fact that Norway is not benefiting through lend-lease, whereas France is, is causing some comment in the trade. Sweden's purchases are without benefit of lend-lease, but in this case this is to be expected, for Sweden was a neutral in the war. Holland is also inquiring for plates, but not as yet on an important scale.

Sheets for countries not buying under lend-lease will be difficult to obtain for delivery over the next several months, although there may be a fair movement of overages and surplus stocks available.

Due to substantial orders for unrated tonnages, some plate mills are now sold up for the remainder of the quarter; others, however, can work in some business as early as late August. One eastern mill has been down for the past several days, due to mechanical difficulties.

Philadelphia — District plate mills have a little capacity available for August, although mechanical difficulties and vacations are cutting into production. Cutbacks in French locomotives are reflected in plate cancellations. Export demand, mainly for shipbuilding, is expected to bolster backlogs in increas-

ng degree. Sweden and Norway are inquiring actively and Holland is expected to show increasing interest shortly. Meanwhile, mills are completing some lend-lease tonnage for France, wth further specifications in prospect. Some special work for the Navy has tightened nearby schedules on plates and shapes. More than 100,000 tons, including 75,000 to 80,000 tons of plates, are involved. It is understood the plates are to be rolled at Fontana, Calif., with fabrication to be done on the West Coast.

Tubular Goods . . .

Tubular Goods Prices, Page 135

Pittsburgh — Reduced requirements for 24-inch pipe for fragmentation bombs have been offset by heavier demand for chemical and high explosive bombs. Little headway has been made against order backlogs for oil country drill pipe and equipment. Jobbers continue to have difficulty in maintaining adequate inventories of mechanical tubing, with mills generally booked into September on this item, although in a few gages openings are reported for October and November. Despite cutbacks in certain war programs, producers see little chance of shipping much tonnage on an unrated basis this year.

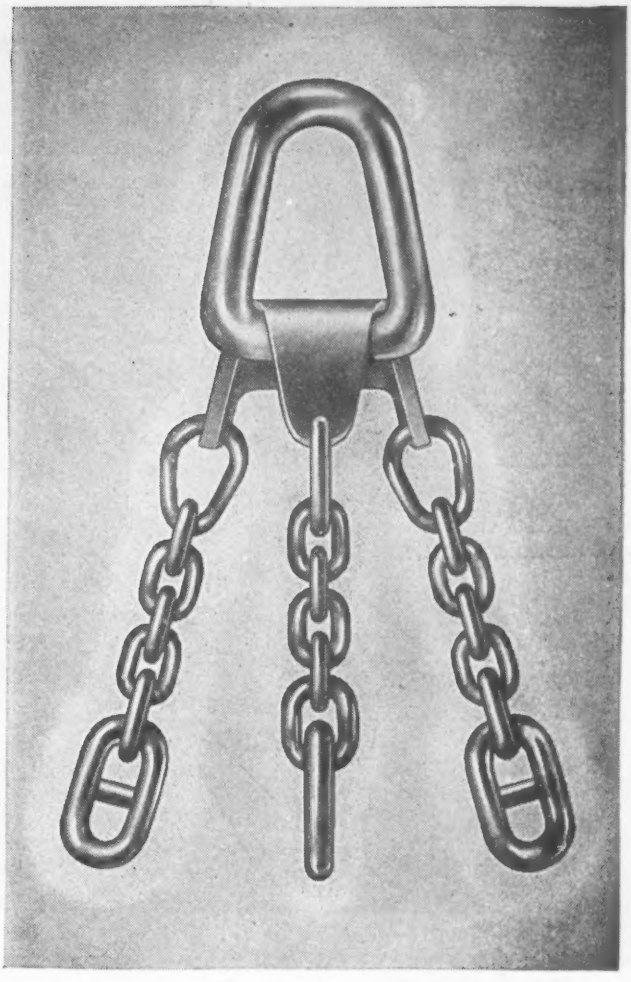
A relatively new requirement of substantial pipe tonnage is for jet assistant take-off cylinders. These rocket action cylinders are attached to planes to give added speed in take-offs, thus making it possible for seaplanes and aircraft carrier borne planes to get into the air much faster. The cylinders are discarded while in flight and retrieved when possible. Sharp reduction in the 240-millimeter down to the 90-millimeter shell programs is expected to force a substantial curtailment in operations at National Tube Co.'s Christy Park works, McKeesport, Pa., beginning Aug. 1.

Seattle — Cast pipe market is potentially strong, many municipalities planning water system improvements, but projects are delayed because of priority regulations. Deliveries have not improved, 75 to 90 days being about the minimum promised. Seattle will open bids Aug. 2 for 20,000 feet of 6 and 8-inch cast iron pipe for the Fourth avenue NE project, about 250 tons. W. P. Harrison, clerk, Great Falls, Mont., will open bids July 30 for 3600 feet of 6-inch. Hillsboro, Oreg., plans a $700,000 water system project, bids to be taken in August for the first unit, an 18-inch supply line. The entire project involves 22 miles of mains. James Barney is city engineer.

Wire . . .

Wire Prices, Page 135

New York—Scattered unrated openings in wire mill schedules for third quarter, including fine sizes, 0.020 in one case, are readily filled, with some bright common wire also included. Cancellations and revisions are slightly higher but affect less than 10 per cent of backlog tonnage thus far. In spots slightly more galvanizing space is available, resulting from cutbacks in communications wire. Easing in demand for rope has been slight, although some continuing directives have been adjusted downward. While some wire will be available for third quarter



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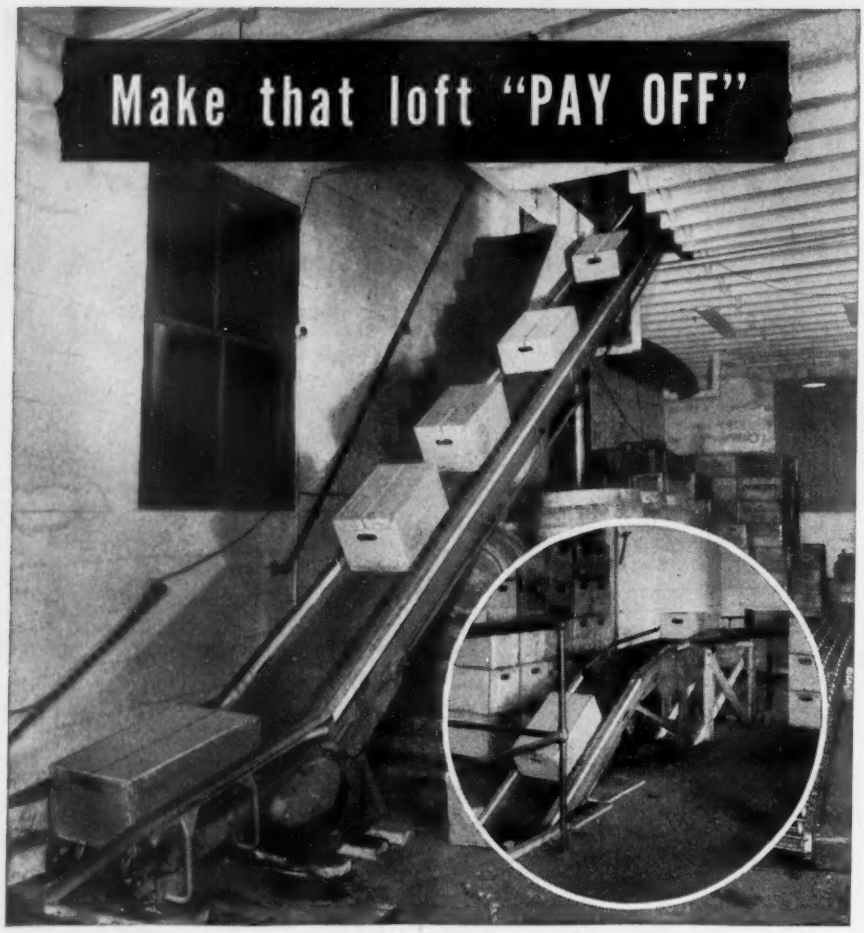

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the total will be small, openings being sporadic and too uncertain to warrant definite delivery promise of unrated volume. Patenting is a choke point. Pressure on most fine wire specialties has not been materially raised. New volume of rated orders is somewhat lower, more apparent in low than in high-carbon.

Boston—Production schedules for tire bead wire for August and September are revised downward slightly in some instances but prospective heavier civilian requirements are expected to balance later reductions in projected war tire programs. In the extremely heavy and small sizes rope wire has eased slightly. Demand from the automotive industry has accumulated in heavier volume, including valve spring wire. Inquiries for the most part are unrated. Cancellations still are too meager to influence tight schedules in fine wire specialties and rated orders for these grades continue substantial. Backlogs for fine wire specialties on rated tonnage take up drafting and processing capacity well through the balance of the year and volume of unrated in fourth quarter will depend largely on cancellations and cutbacks in the next few weeks. Rope wire directives retard progress in increasing production of bed and furniture spring material, for which demand is strong. Demand for welding is 25 to 30 per cent below last year. Nail buying is heavy and jobbers are short of stocks, having canceled some orders this month because of failure of mill shipments. Close to 14,000 tons of nails have been distributed recently.

Pittsburgh—Mills are booked into first quarter on high-carbon quality wire, with demand for wire rope and tire bead wire particularly heavy. Low-carbon items are available for late fourth quarter delivery, and there is some indication that substantial tonnage shipments on an unrated basis may be made this year. Deliveries on box-size cement coated nails are extended into first quarter, while shipment on fence and barbed wire are promised for late this year. A slight increase in output of fence may occur during third quarter, for this item is now out from under CMP directives. Due to the cutbacks recently in fine wire requirements under 0.020 gage, resulting from reduced demand for manufacturers wire, and 50 per cent cutback in Signal Corps communication wire, there may develop late this quarter some open capacity in this range. On basis of current order backlogs of rated orders it does not appear probable that shipments on an unrated basis will occur to any extent until late this year. Renewed pressure for priority assistance is noted from automotive interests. Considerable inquiries on export tonnage are seeking placement for third and fourth quarter delivery without success to date.

Chicago—Wiremakers are making no progress in bolstering stocks of merchant products in hands of jobbers and dealers. Demand for all products is heavy, but can not be accommodated. Manufacturers' wire retains its strong demand and considerable tonnage is being entered on books. High-carbon spring wire is sought most actively, but the situation for it is critical.

St. Louis—Wire producers are under heavy pressure but this condition promises to ease by October. Small sizes of wire are most heavily sought and schedules are much deferred.

Rails, Cars . . .

Track Material Prices, Page 135

New York—While a substantial number of cars are under contemplation, new inquiry recently has been light, featured by a list of 95 to 265 baggage and sleeping cars for the New York Central. Orders include streamlined passenger cars for the Missouri Pacific, with 53 going to American Car & Foundry Co., New York, and an additional number reported placed with Pullman-Standard Car Mfg. Co., Chicago. The Chicago & Alton has purchased 15 passenger coaches from American Car & Foundry Co.

Structural Shapes . . .

Structural Shape Prices, Page 135

Boston—Contract for 1500 tons for an addition to Mystic station, Boston Edison Co., inaugurates heavier demand for fabricated structural steel by utilities. Priorities are approved for a 50,000-kilowatt steam turbo-generating unit, Narragansett Electric Co., Providence; Connecticut Light & Power Co. will spend $22 million for extensions to generating, transmission and distribution systems. At Devon a 45,000-kilowatt station will be installed and a 31,250-kilowatt generator will replace two 10,000 low pressure units at the Montville Power plant. Both new installations will be high-pressure steam units. First steel contracts are placed, including the Devon expansion. New contracts and inquiry are slow, but considerable construction and engineering work is in the planning stage. Demand for light angles is active; deliveries on these sizes and additional others are in November. Structural steel will probably be available on unrated orders for first quarter, but the load on mills has postponed this possibility in volume beyond earlier expectations.

Chicago—Prospects for building construction without priority are not bright, with deliveries on structural shapes ranging into September and later, all involving rated tonnage. WPB has approved numerous small additions to industrial plants when steel is available without priority. Unable to obtain steel, contractors refrain from making commitments. Fabricators still heavily engaged on priority jobs or miscellaneous war construction, find it necessary to comb all sources of supply to obtain required steel. At the same time, contractors seek them out on an increasing scale to figure jobs, but get a high percentage of declinations. Coupled with the shortage of steel is a shortage of engineers to figure jobs and prepare bids.

Seattle—Structural fabricators are fully occupied, military items predominating. No bridge items are up for figures and industrial demands are minor, although some small tonnages have been booked. Subcontracts for shipbuilding and aircraft form most current business. Railroad are reported negotiating with structural shops for cars and other rolling stock, contracts on which are expected to be awarded soon.

New York — Several fair-sized jobs have been placed here, including 4000 tons for a telephone building in Jersey City, N. J., awarded to American Bridge Co., Pittsburgh. Other work includes a stock yard in Jersey City for the Pennsylvania railroad, placed with Phoenix

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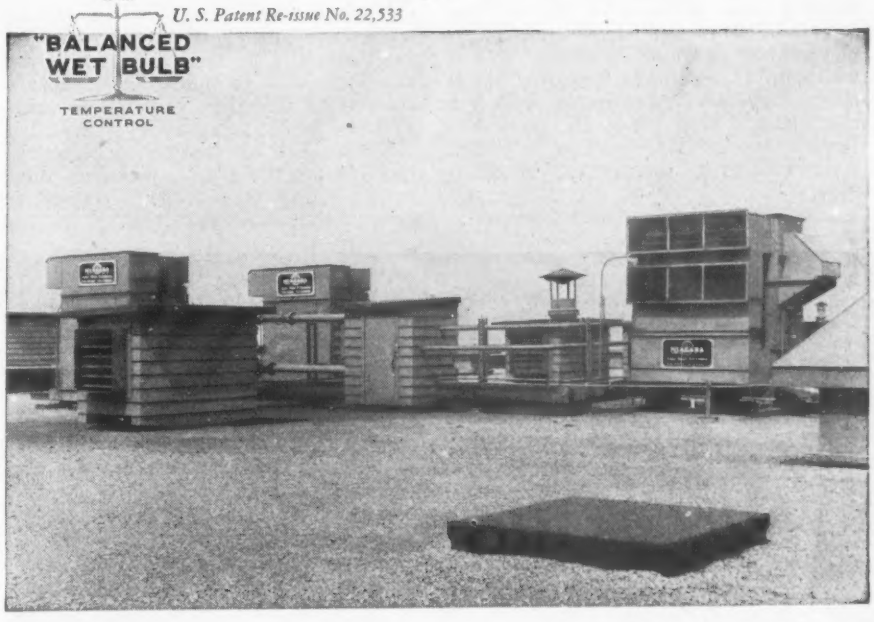

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Bridge Co., Phoenixville, Pa., and 265 tons for one of two buildings for Congoleum Nairn Inc., at Kearny, N. J., placed through Turner Construction Co. with Bethlehem Fabricators, Bethlehem, Pa. Action on 270 tons is expected soon for the other building. Kaye Construction Co., Brooklyn, has been given general contract for a power plant at Astoria, Long Island, for Consolidated Edison Co., New York, requiring 1100 tons. While a fair amount of work is pending there is less new inquiry, due in part to tightness in shape mills schedules. Most producers now are booked well into fourth quarter, with a result construction would be thrown well into the winter. Most producers quote November on standard sections, although some wide-flange tonnage can be delivered in October.

Philadelphia — Shape producers are now booked solidly into November on rated tonnage and into October on wide-flange. Because of various urgency requirements that have come up some building projects carrying ratings have been held up, as steel is not available.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 135

Chicago—With activity in reinforcing restricted by inadequate supply, bar and mesh suppliers are selecting carefully the jobs they wish to figure. Only projects covered by directives or priorities stand a chance for the present. Government has ordered a halt to construction of several heavy truck tire plants, including three in this area—one at Ottawa, Ill., one at Eau Claire, Wis., and one in Des Moines, Iowa. These involved about 1750 tons of bars, of which only a little over 40 per cent had been shipped. The portion canceled helps to relieve the tight situation and will at once go into other important work.

St. Louis—Demand for reinforcing bars is increasing under impetus of projected road, bridge and warehouse construction, numerous projects being outlined for early placement.

Pittsburgh — Indicative of the huge pent-up unrated reinforcing steel demand for miscellaneous small plant expansion projects and municipal work, sellers report that inquiries in each of the last five weeks have exceeded rated tonnage bookings by 2000 to 2500 tons. Backlog of rated tonnage on producers' books is increasing, with deliveries extended into the latter part of October. Bookings to date this month are 20 per cent above those in same period during June. Space permitted concrete bars on billet mills is much below the tonnage represented by validations, with the result that producers have been forced to book considerable more tonnage than indicated production schedules will yield this quarter. No relief is in sight as long as merchant bars continue to crowd reinforcing bars off the mills. Over 1000 tons will be required for a coal cleaning plant for United States Coal & Coke Co. at Wilcoe, W. Va. Rust Engineering Co. will handle the construction, with McNally Pittsburgh Mfg. Co., Pittsburgh, general contractors.

New York — Corbetta Construction Co., New York, has closed on 400 tons of reinforcing steel for Navy warehouses at Mechanicsburg, Pa., to Fireproof Products Co., New York. Bids have been closed on 110 tons for a plant addition for Remington Rand Co., South Norwalk, Conn.

Pig Iron . . .

Pig Iron Prices, Page 137

Tightness continues in pig iron, with supply and demand fairly balanced, though melters need more than is available in some cases. No stocks are being built by producers and not all melters have inventories up to allowable level. Some blast furnaces under repair are nearly ready to resume production, which will ease the situation soon. A strike at foundries in northern Illinois is easing demand in that area.

New York—While pig iron is becoming increasingly tight, the melt in this district will be off somewhat this month, mainly because the various foundries closed down the first week of July for vacations and inventory taking. Also there have been some labor disturbances and foundries generally have not been able to maintain as many employes on the payroll as even a month ago. Were it not for lack of labor, the suspensions in operations during the first week could have been offset quickly, as there is considerable business available.

The scarcity in pig iron is ascribed to several factors, including shortage of labor, fuel and cast scrap, the latter causing consumers to make heavier demands for pig iron than would otherwise be the case. Some furnaces, further, have been down for repairs and are slow getting

back into production. One large stack in Buffalo, for instance, has been down since early in the year, having to undergo extensive repairs. It is now expected to be back in operation late in August.

Export demand is heavy, notwithstanding the fact that a number of the various inquiries reported are likely duplications. However, as iron is in such pressing need in this country, relatively little is being shipped abroad at this time.

St. Louis—Pig iron continues tight here and is expected to continue so through third quarter. Virtually all is covered by rated orders, but civilian inquiries are increasing. Manpower shortage is a choke point and it is estimated output could be increased 25 per cent if labor were available. Local demand is being met but producers had hoped to increase production and thus help other districts.

Chicago—The close balance between supply and demand in pig iron will be eased to some extent by the strike of over 2000 foundry workers in this area, which started July 23. Affected are 25 foundries in Chicago and 14 in Joliet, Aurora and Batavia, Ill. This work interruption has stopped production of vital castings for war use, already behind schedule because of shortage of manpower.

Cincinnati — While movement of pig iron, both northern and southern, into this district holds close to an established level, there is a marked improvement in promptness of shipments. This has relieved one of the anxieties of melters which developed early in the year and persisted. The demand for castings is unrelaxed but foundries still complain about labor scarcity, and therefore plan no immediate expansion in melt.

Buffalo — Considerable pig iron production was piled on the ground as the railroad car shortage reached a serious stage last week. The situation later improved but not all accumulations have been cleared and more distant foundries are pressing for iron. Cutting off lend-lease operations with Russia has resulted in cancellations of machine tool orders with leading midstate foundries. On the whole, however, sellers report demand fully sufficient to absorb output. Labor being released by other war plants is refusing to accept employment in foundries, which are still crying for additional help.

Philadelphia — Pig iron continues under steady pressure, with shipments balancing requirements. July melt in this district, however, is down from June, due to foundry suspensions early in the month and to somewhat lighter steel ingot production.

Scrap . . .

Scrap Prices, Page 138

Strength continues in steel and iron scrap as melters seek further supply and dealers find difficulty in preparing material in their yards. Prices of borings and turnings are reaching ceiling in view of smaller supply and maintained demand. Some allocations are being made to provide supply in areas where local production is insufficient to meet needs.

Pittsburgh—Mixed borings and turnings, machine shop and short shoveling turnings reached ceiling on sales last week. However mills are reluctant to pay more than the $1 freight equalization, with the result that little tonnage is being shipped here from the East, as ceiling prices prevail there. Production scrap tonnage is dropping off, due to cutbacks in shipbuilding and other war programs. Processing of scrap through dealers' yards continues to be retarded by lack of manpower, with the result that most yards are well behind schedule in filling orders. Although dealers are moving scrap as fast as possible they are hesitant to stock up too heavily as a hedge against such a reaction in prices as occurred last fall. There is strong demand for plate scrap and punchings; in fact all items are in active demand. Scrap inventories are in fairly good balance, but are abnormally low with little headway being made toward building up stocks for winter. Barring early termination of the Pacific war, some trade interests anticipate a serious scrap shortage early next year. The Pennsylvania Railroad list closed recently, involving 8000 tons of heavy melting steel. Distribution of this scrap has not yet been announced, but probably all will be allocated, perhaps to the Chicago district, where a tight situation exists. This area is not expected to share in the allocation.

Cleveland—Tightness in steel and iron scrap in this area is characterized as worst since early months of the war, with supply short, consumer inventories declining and labor limiting preparation of such material as has been collected. In addition to small supply a shortage of cars limits shipments, which are well be-

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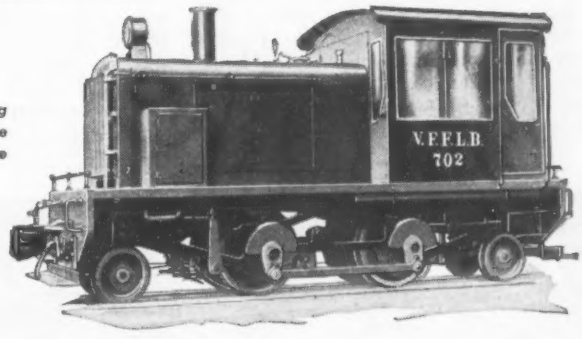

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hind schedule. It is a sellers' market and all prices now have returned to ceilings, including borings and turnings. Adjacent markets also have gone to ceilings under pressure for the small supply. All consumers are trying to buy further but meet little success under present conditions. Some brokers hold that consumers are to blame for part of the situation, in that they remained out of the market a few months ago when they could have obtained tonnage more readily and built up reserves.

Buffalo — Despite recent substantial sales, the reserve stockpile of one of the top mill consumers remains at the lowest point of the year. Dealers' sentiment shows decided improvement with higher prices on latest sales accompanied by talk that all items will be quoted at ceilings on the next large sale. Further bolstering the local market was the fact that no additional scrap arrived from the seaboard via the canal during the week. Another shipment, however, is scheduled to arrive next week with approximately 5000 tons from Duluth. Cutbacks and cancellations in shell orders are reflected in a sharp falling in turnings receipts. As a result, the trade figures new sales will be at ceiling. One consumer is discussing the possibility of bringing in scrap from New England.

St. Louis—Scrap shipments in this area continue slow and supply tight. Melters are buying more freely, although reserves are reported fair. No increase in shipments is expected, because of the labor shortage in yards. Brokers hope for a freer release of surplus material which may be scrapped. Tonnage continues to bypass this district, moving to Chicago. Local brokers are sending only turnings and bundles to the Chicago market.

Cincinnati—Major purchasers of iron and steel scrap appear content with inventories, and recent buying has been limited. No movement to supplement stocks, which might be interpreted as preparedness against shortage later in the year, has appeared. Yards are fairly well stocked, partly due to recurring shortage of manpower. Demand for turnings, seen in nearby districts, is not reflected here and the price differentials are justifying shipments out of this district.

Seattle—Little change is noted in the scrap market, with supplies ample for current needs and mills buying enough to cover consumption. Stocks are not being increased. Scrap dealers are still short of help and have difficulty in preparing material.

Chicago — Good demand for turnings and borings and shortening supply, the latter reflecting recent cutbacks in war contracts, have operated to move all grades to full ceiling. This now brings all grades of scrap to OPA maximum levels. Heavy melting and foundry grades are not as plentiful as recently and consumers take offerings freely. Flow of material continues to be hampered by lack of labor in dealers' yards. Steelmakers, still operating at near maximum capacity, are obliged to lean more heavily on scrap because supply of hot metal has declined with five district blast furnaces down for repairs. It would appear that a tight situation in scrap will prevail until V-J day.

Philadelphia — Prices on all grades of scrap remain at ceilings, reflecting shortage in melting steel resulting from lack of manpower for preparation and in cast grades for the same reason and scarcity of material as well.

New York — The leading eastern scrap consumer is specifying heavily for heavy melting steel and borings and turnings for shipment to Bethlehem, Pa., with some tonnage for Sparrows Point, Md., though most tonnage for the latter from northern areas comes from New England. Little tonnage is being specified for Lackawanna, N. Y., from the metropolitan district, nor is any tonnage moving from here to the Pittsburgh district. Shipments against old contracts for Pittsburgh have been completed and no new buying is reported. Meanwhile, brokers are paying ceiling on all grades.

Warehouse . . .

Warehouse Prices, Page 136

New York—Not over 10 per cent of the whole, unrated orders offered and accepted by warehouses are below expectations. Most of this volume is filled; distributors committed on mill orders through the balance of this year, base their policy of accepting unrated tonnage substantially on belief replacements will improve next quarter or at least against forward orders now with producers. Others fill unrated orders only on products which obviously may be replaced on the same basis, plates, heavy sheets and other scattered items. As regards light-gage sheets, strip, tubing and nails most sellers are inclined toward caution in accepting unvalidated orders. Aggregate sales this month will be slightly under June. Demand for structural shapes is keen.

Chicago—Certain small structurals and odd thicknesses of plates are about the only steel which warehouses can supply for unrated inquiries. All other products are in such short supply that they must be sold on a rated basis to insure replacement from mills. In general, receipts of steel are holding fairly good balance with sales. Distributor transactions are about as numerous as recently, but amount of steel per order is somewhat decreased. Cold-finished bars in smaller sizes are in more free supply, but the larger sizes continue critical. Inquiries for characteristics on various steels are more numerous, indicating that manufacturers are turning to problems in connection with resumption of civilian goods manufacture.

Boston—Declines in rated sales center largely in heavier hot-rolled products, which are also available against unvalidated orders, including plates and heavier sheets. Aggregate volume is slightly below last month. Light flat-rolled demand is in excess of current replacements. Alloy buying is relatively well maintained, although pressure for bars has subsided, both carbon and alloys. Decline in shipyard buying, affecting a wide range range of products, is not balanced in other directions, but in Connecticut area demand by the aircraft industry holds relatively high.

Seattle—Demand is steady for all steel items and turnover is large. Galvanized sheets continue the most critical item, with light-gage material scarce and deliveries far forward and uncertain. Sheet promises are at least nine months delayed.

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Supply of plates, bars and structurals is easier. Alloys are in strong demand. Stocks of some items have been increased but in most instances materials move out promptly.

Cincinnati — Warehouse business tapered moderately in July, compared with recent booming months. Vacations and other seasonal causes may have been more important in this effect than cutbacks in demands. Some unrated orders are being filled, inquiries of this class being small, far below the volume expected. Despite a fair flow of replacement steel, jobber's stocks continue full of gaps.

Semifinished Steel . . .

Semifinished Prices, Page 134

Pittsburgh — Continued tightness in semifinished steel is indicated by the inability of French and Belgian interests to get substantial tonnages for their account on rolling schedules for delivery late this quarter or early next. Sharp cutbacks in heavy artillery shells have not yet affected current bar mill schedules, while steel made available through the reduction in plate production has been diverted into other channels where it is urgently needed. Demand for wire rods is particularly heavy, with an export tonnage for France of 40,000 tons waiting placement for over a month. Mill inventories of semifinished are in fairly good balance, although relatively low compared to peacetime operations.

Metallurgical Coke . . .

Coke Prices, Page 135

Pittsburgh—Bituminous coal output in this district is now back to normal with resumption of operations at Jones & Laughlin Steel Corp.'s Shannopin mine at Bobtown, Pa. Capacity output at all mines over the remainder of this year will be essential to avoid a critical coal shortage this winter for many industrial companies, utilities and transportation facilities. In addition to the necessity of making up lost ground in coal production, resulting from strikes and manpower shortages, coal operators are faced with the problem of supplying 6 million tons for export to Europe.

Beehive coke operations here have held relatively stable at close to 75 per cent of capacity, with by-product operations also showing little change at a practical capacity. Contracts have been let by Carnegie-Illinois Steel Corp. for rebuilding by-product batteries 21 and 22 at its Clairton, Pa., works. One of the batteries is now being rebuilt and will be completed next March. Rebuilding of the second battery is to start in March, to be completed one year later. OPA decision on bituminous coal price increase is expected soon.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4000 tons, telephone building, Jersey City, N. J., to American Bridge Co., Pittsburgh; Mahony-Troast Construction Co., Passaic, N. J., general contractor.

1500 tons, addition, Mystic station, Boston Edison Co., to American Bridge Co., Pittsburgh.

1000 tons, power plant, Connecticut Light & Power Co., Devon, Conn., to American

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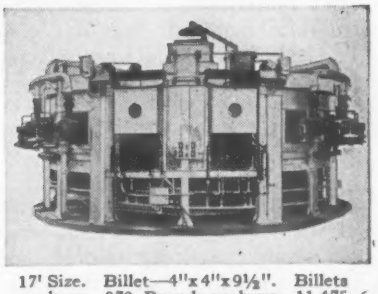
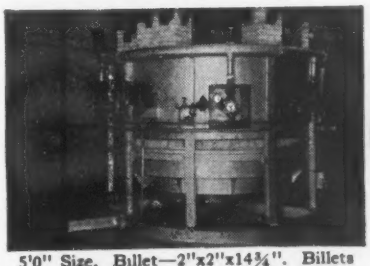
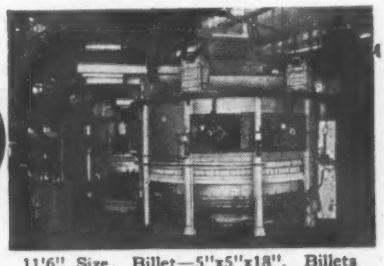


17' Size. Billet—4"x4"x9½". Billets per hour—270. Pounds per hour—11,475 Used with 2—200 Ton Presses.



5'0" Size. Billet—2"x2"x14¾". Billets per hour—71. Pounds per hour—1190. Used with 1500 lb. hammer

WRITE FOR BULLETINS



11'6" Size. Billet—5"x5"x18". Billets per hour—33. Pounds per hour—4200. Used with No. 6 Upsetter.

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DETROIT CHICAGO LOS ANGELES SAN FRANCISCO

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Bridge Co., Pittsburgh, through United Engineers & Constructors, Philadelphia.

910 tons, research laboratory, Johns Manville Co., Manville, N. J., to Belmont Iron Works, Eddystone, Pa.

402 tons, replacement, section Brigantine bridge, Absecon channel, Atlantic county, New Jersey, to Phoenix Bridge Co., Phoenixville, Pa.; Charles Vachris Co., Brooklyn, general contractor: 434 tons steel H-piles to Bethlehem Steel Co., Bethlehem, Pa.; bids July 9, Trenton, priority AA-3.

300 tons, ten engine test buildings, various locations, for Bureau of Yards and Docks, U. S. Navy, Chicago, to Great Lakes Steel Corp., Detroit; bids July 2.

245 tons, Bamburger underpass, Arsenal Utah, for federal government, to Minneapolis-Moline Power Implement Co., Minneapolis.

STRUCTURAL STEEL PENDING

540 tons three 100-foot deck plate girder spans, Gallup, N. M., for Atchison, Topeka & Santa Fe railroad; bids July 26.

480 tons, warehouse and shop building, Southern Counties Gas Co., Los Angeles.

250 tons, factory building, Elkhart, Ind., for Adams & Westlake Co.; bids July 18.

REINFORCING BARS . . .

REINFORCING BARS PLACED

445 tons, welded wire mesh, includes 235 tons in Federal aid route 5 Sec. 7X-2, Livingston and Grundy counties, and 210 tons in Sec. 11X-i, same route, Livingston county, for Illinois State Highway Commission, to Edgar W. Zimmerman, Chicago; Thomas McQueen Co., Forest Park, Ill., contractor; bids June 15.

REINFORCING BARS PENDING

700 tons, plant addition for Philco Corp., Philadelphia; John Steele, Philadelphia, general contractor.

132 tons, also 17 tons gages and other items, for Deschutes project; bids to Bureau of Reclamation, Bend, Oreg., Aug. 2.

103 tons, school and convent, St. Joseph's Church Shrine of St. Anne, Chicago; bids July 26.

100 tons, Protestant Deaconess Hospital, Evansville, Ind.; bids July 30.

PIPE . . .

CAST IRON PIPE PLACED

800 tons, fabricated steel pipe, mainly 48-inch diameter, for city of Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

CAST IRON PIPE PENDING

250 tons or more, 6 and 8-inch Class 150, for Fourth avenue NE project, Seattle; bids Aug. 2.

Unstated, 18-inch supply line and other items, first unit in proposed $700,000 water system, Hillsboro, Oreg.; bids in August.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chesapeake & Ohio, two streamlined stainless steel passenger trains, to Edward G. Budd Mfg. Co., Philadelphia.

Chicago & Alton, 15 passenger coaches, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Louisville & Nashville, 1000 coal cars and 1000 box cars; bids asked soon.

New York Central, 95 to 265 baggage and sleeping cars; bids asked.

LOCOMOTIVES PLACED

War Department, 47 0-6-0 steam locomotives for operation in the Far East, to H. K. Porter Co., Pittsburgh.

LOCOMOTIVES PENDING

Louisville & Nashville, 16 diesel switching locomotives; bids to be asked soon.

Few Procurement Changes Expected in Navy Program

(*Concluded from Page 75*)

be counted on to bring about a greater appreciation in the United States of the advantages that derive from intelligent standardization. If the trend in the Pacific approaches its ultimate development, a housewife in the future need not take her electric iron to the service establishment representing the manufacturer, but can get it repaired at any nearby shop having a stock of interchangeable electric iron parts.

One high ranking Naval officer in the Pacific believes that the knowledge so many hundreds of thousands of our men are gaining about living conditions and requirements in the various Pacific areas will be of importance to our economy in still another direction. That is, in the development of foreign trade with Pacific countries. They know not only what the new preparation DDT does to all manner of insects, but they know also what it does to the birds and animals that feed on insects. For example, the pet lizard which one of our sailors was fond of leading around on a leash on an island in the western Carolines starved to death after DDT had done its work. Our boys know what happens to unprotected steel in hot, humid places; they know why houses and other structures have longer life in that climate when frame members are mortised together and roofs are tied down with cord made of coconut fiber. They know what the natives eat, what they wear. They know about water buffaloes and other animals. This officer believes that when hundreds of thousands of men get back home, many of them will generate ideas that will be helpful to our export trade in the Pacific.

Machinery's Role Vital in Food Production Program

(*Continued from Page 48*)

growing, harvesting and preserving garden products. One of the first steps of the institute was the launching of the industrial company-garden campaign. In almost every instance where a company had gardens for employes, or fostered home gardens, executives reported the program was most successful and the best employe-management project they had tried.

To enumerate the extensive activities of all the company-employe gardens located throughout the country would fill volumes. Industry's participation in the garden program resulted in more than two million Victory Gardens last year. The program this year is being prose-

cuted just as vigorously. For example, for the third consecutive year, thousands of Victory gardeners of Carnegie-Illinois Steel Corp. are wielding their spades and hoes in anticipation of what is hoped to be a record season. At many of the company's plants ground has been allotted to workers, plots being plowed by the company and lime and fertilizer furnished wherever feasible.

Some idea of the co-operation industry is giving to the garden movement in one state may be had from returns from county agricultural agents and industrial chairmen co-operating with the Governor's War Garden Committee in Massachusetts. A total of 428 acres of company-sponsored gardens is being worked on company property by 200 industrial firms throughout the state. In addition there are 39,155 employes backyard gardens under cultivation. Several companies provide seeds and other supplies at cost and distribute quantities of garden literature.

Among firms which were awarded the National Victory Garden Institute plaques for outstanding achievement in gardening in 1944 were: Aluminum Co. of America, American Rolling Mill Co., Armstrong Cork Co., Barkelew Electric Mfg. Co., Bendix Aviation Corp., Carnegie-Illinois Steel Corp., Chrysler Corp., Corning Glass Works, Crane & Co. Inc., Crosley Corp., Dayton Tool & Engineering Co., Deere & Co., Firestone Tire & Rubber Co., Graflex Inc., Ford Motor Co., Dow Chemical Co., General Electric Co., General Motors Corp., Goodyear Tire & Rubber Co., Hercules Powder Co., International Business Machines Corp., International Harvester Co., Keystone Steel & Wire Co., Lukens Steel Co., Maytag Co., Perfect Circle Co., Pullman Co., Radio Corp. of America, Texas Co., Thompson Aircraft Products Co., United Aircraft Corp., Westinghouse Electric Corp., Willys-Overland Motors Inc. This lists only a few of the hundreds of firms which participated in the garden program last year and are participating in it this year.

Iron Ore . . .

Iron Ore Prices, Page 136

Lake Superior iron ore consumed in June totaled 6,397,091 gross tons, according to figures of the Lake Superior Iron Ore Association, Cleveland. This compares with 6,872,461 tons in May, which had one more working day, and with 7,112,060 tons in June, 1944. For first half this year consumption was 40,346,303 tons, compared with 44,290,230 tons in the comparable portion of last year. As of July 1 active furnaces numbered 169, of which 162 were in the United States and seven were in Canada.

Stocks of ore on hand at furnaces and Lake Erie docks July 1, were 24,847,472 gross tons, compared with 26,655,414 tons at the same date last year.

First iron ore loaded from the new docks at Port Arthur, Ont., was taken aboard the steamer Marquette of the Cleveland-Cliffs fleet last week and unloaded at Ashtabula. This was from the new mine at Steep Rock, Ont., which previously had shipped to Superior, Wis., pending completion of the new dock.

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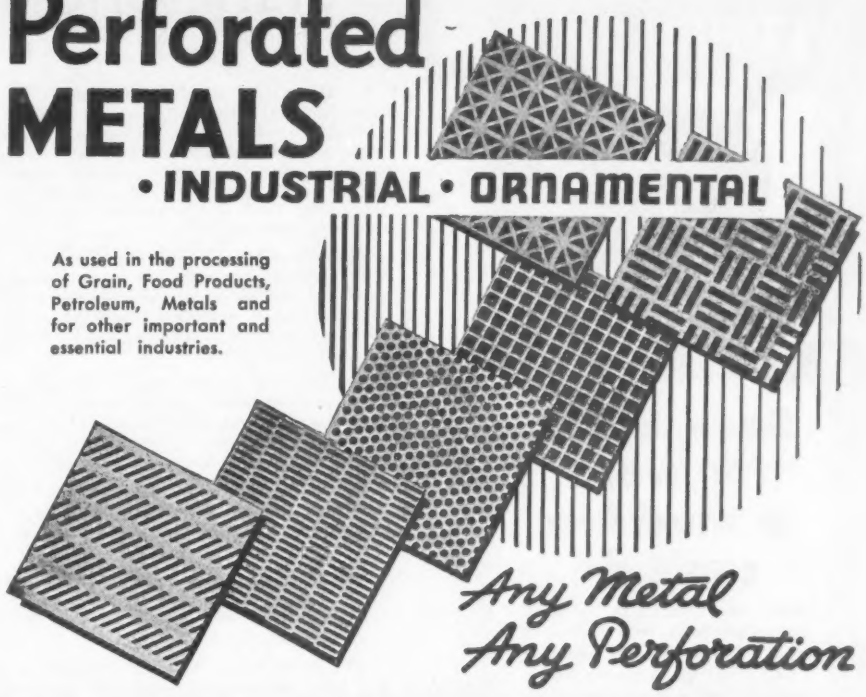

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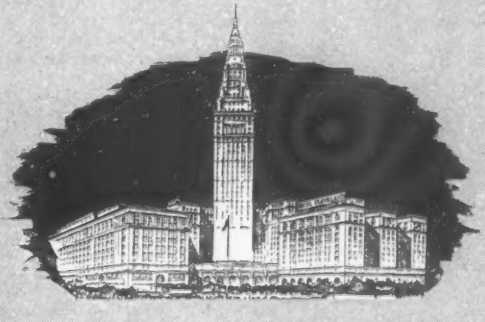

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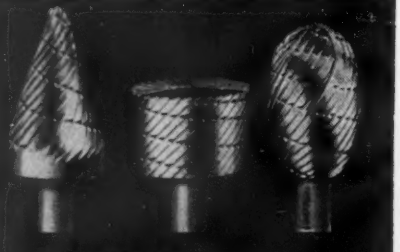

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CONSTRUCTION AND ENTERPRISE

OHIO

AVON, O.—B. F. Goodrich Chemical Co., Rose building, Cleveland, will let contract soon for a pilot plant, including process building, laboratory and machine shop, boiler house, sewage disposal plant and equipment, to cost about $600,000. Bonfield & Cummings, 1900 Euclid avenue, Cleveland, are architects.

CLEVELAND—Superior Wringer Mfg. Co., 5911 Lexington avenue, has been incorporated with 200 shares no par value to manufacture wringers and other household equipment, by Milton E. Glick, 539 Leader building, and associates.

CLEVELAND—Metal Slat Mfg. & Supply Co. has been incorporated with 250 shares of $100 par value to manufacture venetian blind slats and other accessories, by Stephan J. Vance, 144 East 203rd street, and associates.

CLEVELAND—Hotstream Heater Co., 2363 East 60th street, is building a one-story addition 140 x 160 feet, estimated to cost over $50,000.

CLEVELAND—Linderme Tube Co., 1500 East 219th street, will build a plant addition to cost about $75,000. E. G. Hoeffer, 5005 Euclid avenue, is engineer.

CLEVELAND—Barco Machine Products Co. has been incorporated with 500 shares no par value to manufacture machinery, tools and other devices, by William A. Kenerson, agent, 1975 East 65th street, and associates.

CLEVELAND—Plastic Mold & Die Co. has been incorporated with 250 shares of $100 par value to manufacture molds and dies, by Thomas Zeelo, agent, 1965 East 65th street, and associates.

CONNEAUT, O.—Astatic Corp., 830 Market street, F. H. Woodworth, president, manufacturer of microphone and phonograph pickups, will build a one-story addition, estimated to cost $50,000.

CUYAHOGA FALLS, O.—Summit Grinding & Machine Co. has been incorporated with $51,000 capital. H. W. Schwab, 32 Elmdale road, Akron, O., is attorney. Company will manufacture machine parts and do grinding.

MANSFIELD, O.—Ohio Welding & Boiler Repair Co. has been incorporated and will enter the welding business on Ashland road. True D. Dettmar, 54 Grasmere avenue, is agent. Company is capitalized at 250 shares of $100 par value.

MASSACHUSETTS

CANTON, MASS.—Draper Bros. Co., Draper Lane, will let contract soon for a boiler plant to cost over $40,000. A. Nelson, Square building, Boston, is architect.

EAST SPRINGFIELD, MASS.—Westinghouse Electric Corp., 653 Page boulevard, has let contract to Ley Construction Co., 1215 Main street, Springfield, for a one-story 120 x 145-foot building, estimated to cost $250,000.

FRAMINGHAM, MASS.—Worcester Gas Light Co., 240 Main street, plans a boiler plant on Irving street, to cost $75,000.

CONNECTICUT

BRIDGEPORT, CONN.—Bridgeport Brass Co., 40 Grant street, has let contract to O. F. Burghart, 871 Central avenue, for a three-story plant addition at Main and Water streets, to cost about $500,000.

STAMFORD, CONN.—Electronic Rubber Co., 69 Sunnyside avenue, will let contract soon for a one-story 50 x 150-foot factory and boiler plant, to cost about $40,000. D. Mansell, 24 Park Row, is architect.

STAMFORD, CONN.—Globe Slicing Machine Co. Inc., 224 Selleck street, has let contract to E. A. Nordholm Co., 107 Patterson avenue, for a plant costing about $40,000.

STAMFORD, CONN.—Pitney-Bowes Postage Meter Co., Walnut street, has let contract to Turner Construction Co. Inc., 420 Lexington avenue, New York, for a plant estimated to cost $1,250,000. Voorhees, Walker, Foley & Smith, 101 Park avenue, New York, are architects.

NEW JERSEY

HAMBURG, N. J.—Jersey Plastics Corp., Union avenue, Lodi, N. J., has let contract to Fatzler Co., 653 South 15th street, Newark, N. J., for a plastics plant to cost about $75,000. Benton Associates, 170 Broadway, New York 7, are engineers and architects.

MICHIGAN

AU GRES, MICH.—Au Gres Tool Mfg. Co. is building a one-story plant 62 x 140 feet.

DETROIT—Continental Development & Engineering Co., 14819 Charlevoix street, has been incorporated with $100,000 capital to manufacture tools, dies, jigs and fixtures, by Joseph Neukan, 14579 Archdale street.

DETROIT—Wayne Sheet Steel Co., 3729 Barlum Tower, has been incorporated with 50,000 shares no par value to deal in new and used steel, iron and other metal products, by Daniel P. O'Brien, same address.

ILLINOIS

ALTON, ILL.—WPB has given approval to International Harvester Co., 180 North Michigan avenue, Chicago, for proposed $44 million plant for manufacture of farm tractors on 375-acre tract near here.

ALTON, ILL.—Laclede Steel Co., 806 Olive street, St. Louis, will let contract soon for a two and part three-story 84 x 118-foot laboratory and engineering building, at its steel plant. Jamieson & Spearl, 806 Olive street, St. Louis, are architects.

AURORA, ILL—Austin-Western Road Machinery Co. has let contracts for a one-story plant addition 85 x 360 feet. E. O. Sessions & Co., 1 North LaSalle street, Chicago, are engineers.

DECATUR, ILL.—Oakes Products, branch of Houdaille-Hershey Corp., has let contract to R. W. Christy, 740 South Main street, for a one-story addition to its automobile parts factory, to cost about $200,000.

WISCONSIN

PORT WASHINGTON, WIS.—Western Investment Co. has let contracts for a one-story assembly plant 120 x 120 feet, to be occupied by Simplicity Mfg. Co., manufacturer of agricultural implements.

MERRILL, WIS.—Ward Paper Co. will let cantracts soon for two one-story plant additions, 80 x 144 feet and 36 x 54 feet.

MILWAUKEE—Dickten & Masch Tool & Die Co., 900 East Vienna avenue, has let contract to Peters Construction Co. for a one-story plant 60 x 200 feet.

WATERTOWN, WIS.—Synchromatic Research Corp., 5110 North 35th street, Milwaukee 9, will build a one-story 100 x 250-foot plant.

WISCONSIN RAPIDS, WIS.—Consolidated Water Power & Paper Co. has started construction of a one-story plant addition 40 x 137 feet for plastics department.

MINNESOTA

GRAND RAPIDS, MINN.—Blandin Paper Co. has let contract to Paul A. Laurence Co., Minneapolis, for an addition and improvements to paper mill. Helmick, Edeskuty & Lutz, Essex building, Minneapolis, are engineers.

MINNEAPOLIS—St. Paul Hydraulic Hoist Co.,

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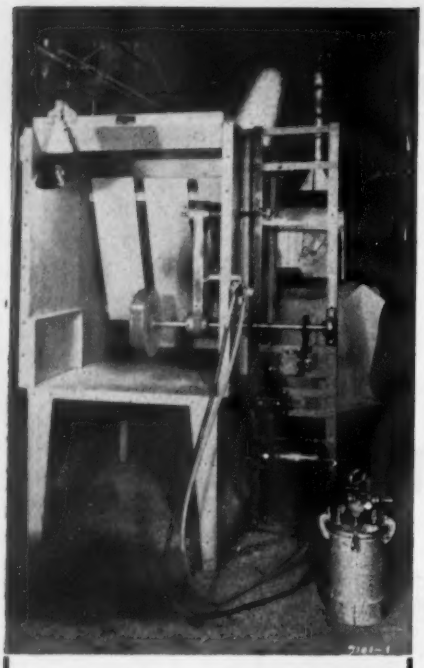

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DETROIT 9

manufacturer of hydraulic hoists, bodies, etc., has let contract to August Cederstrand Co. for a one-story plant addition 66 x 150 feet, for a craneway.

MINNEAPOLIS—Twin City Brass & Aluminum Foundry Co., 1918 Washington avenue South, has let contract to Kraus-Anderson Inc. for a one-story machine shop 50 x 100 feet.

MINNEAPOLIS—General Mills Inc., Chamber of Commerce building, has let contracts for a one-story machine shop addition 70 x 130 feet at research laboratories, 2010 East Hennepin avenue.

MINNEAPOLIS—Minnesota & Ontario Paper Co., Baker Arcade building, Donald D. Davis, president, announces expansion and modernization program at mills at International Falls, Minn., and at Fort Francis and Kenora, Canada, to cost over $6 million. International Falls expansion will include bleaching and filtration plants, research laboratory and pulpwood grinding machinery and papermaking machinery. Canadian mill improvements will include tug and work boats, other marine equipment and installation of new pulp grinding equipment.

WINONA, MINN.—Winona Knitting Mills Inc. plans a four-story factory addition 75 x 75 feet, to cost about $150,000. George H. Burrows & Associates, Shaker Heights, Cleveland, O., are architects.

WINONA, MINN.—Winona Machine & Foundry Co., Robert Leicht, manager, plans a one-story foundry addition.

KANSAS

KANSAS CITY, KANS.—Atchison, Topeka & Santa Fe railroad has let contract to Ellington Miller Construction Co., Chicago, for a roundhouse addition, including machine shop, 60 x 74 feet, laboratory and enlargement of 22 locomotive stalls, to cost $600,000.

TEXAS

CORPUS CHRISTI, TEX.—Central Power & Light Co. plans a machine shop and laboratory unit to cost about $45,000.

DALLAS, TEX.—Better Monkey Grip Co., care T. D. Broad, architect, Burt building, Dallas, will let contract soon for a 100 x 201-foot plant costing about $100,000.

FORT WORTH, TEX.—Plastilite Engineering Co., 2500 West Vickery street, will build a machine shop and fabricating plant costing about $40,000.

MINERAL WELLS, TEX.—Jaques Power Saw & Steel Co. plans plant expansion to cost about $40,000.

IOWA

DES MOINES, IOWA—National Milker Co., manufacturer of milking machines, has added a pump division for manufacture of a new type water pump. Estimated peacetime production of 30,000 to 50,000 units per year is planned.

DUBUQUE, IOWA—John Deere & Co., Moline, Ill., manufacturer of agricultural implements, has let several contracts for new plant at Dubuque, consisting of 11 buildings, including three primary factory buildings, 140 x 420 feet each, assembly building 120 x 500 feet, receiving and storage building 140 x 540 feet. Day & Zimmerman Inc., Packard building, Philadelphia, are consulting engineers.

WEBSTER CITY, IOWA—Beam Mfg. Co., manufacturer of washing machines, will let contracts soon for a one-story plant addition 117 x 130 feet. Walter B. Wheeler, Metropolitan Life building, Minneapolis, is engineer.

IDAHO

BOISE, IDAHO—Idaho Power Co. has plans for a second power plant of 13,500 kw, hydrogenerating, on Snake river near Hagerman, Idaho. C. J. Strike is president.

WALLACE, IDAHO—Ross Roundy and E. G. Smith, Wallace, have ten-year lease on King & Queen mine near Keystone, Mont., and plan installation of a 100-ton mill, contract being placed with Henry Johnson, Wallace.

CALIFORNIA

LOS ANGELES—Hayes Furnace & Mfg. Co., 2831 Exposition place, is erecting a factory and office building at 2929 South Fairfax avenue, 110 x 148 feet, to cost about $35,000.

LOS ANGELES—Fluid Packed Pump Co. is building a warehouse building 84 x 84 feet at 3142 Norwalk boulevard. Whittier, Los Angeles, to cost about $12,000.

BURBANK, CALIF.—Lockheed Aircraft Corp., for Defense Plant Corp., is building a warehouse at 2850 North Ontario street, 200 x 400 feet, to cost about $234,000.

LOS ANGELES—Kruse Metals Mfg. Co. will build a plant 77 x 131 feet at 1359 Channing street, to cost about $18,000.

LOS ANGELES—Reliable Auto Body Works, 16029 South Avalon boulevard, Gardena, Calif., will erect a factory building at 1608 Essex street, Los Angeles, to cost about $27,000.

LOS ANGELES—Allen Mfg. Co. has building permit for erection of a machine shop at 9324 Graham avenue, Florence district, 60 x 108 feet, to cost about $15,000.

POMONA, CALIF.—Fairbanks, Morse & Co. has building permit for a compressor building at 206 East Commercial street, 24 x 31 feet, to cost about $5000.

SOUTH GATE, CALIF.—Pacific Screw Products Co. is building a plant addition at 5211 Southern street, to cost about $10,000.

VERNON, CALIF.—Conveyor Co. is building a factory structure at 3260 East Slauson avenue, to cost about $9500.

OREGON

DRAIN, OREG.—Owners of Whipple sawmill, recently burned, plan to rebuild, following WPB approval, at cost of $50,000, including 250-hp plant all electrically operated and fireproof.

PORTLAND, OREG.—WPB has approved $62,000 project by Oregon Lumber Co. for a sawmill addition at Bates, Oreg., and installation of boiler and power plant.

PORTLAND, OREG.—L. H. Hoffman has $130,000 contract from McCormick & Baxter for timber creosoting plant at St. Johns, Oreg., on 50-acre tract, including tanks, boilers, pressure retorts and railway tracks.

PORTLAND, OREG.—Victory Steel Fabricating Co., Ben Kobach, owner, will rebuild burned plant, replacing forge shop, sheet metal shop and much equipment.

WASHINGTON

CAMAS, WASH.—Crown Zellerbach Corp. has announced plans for $15 million expansion in pulp and paper mills at Camas, Port Angeles and Port Townsend, Wash., and West Linn, Oreg. Plant at Camas will be almost doubled and a sulphite bleaching plant added.

CAMAS, WASH.—L. H. Hoffman, Portland, Oreg., has contract for an addition to plant of Crown-Willamette pulp mill to house hydraulic barking equipment.

PUYALLUP, WASH.—WPB has approved $170,000 cold pack and quick freeze plant for Farmers' Co-operative, W. C. Reeves, manager. Bids will be called soon for two-story plant.

SEATTLE—Stack Steel & Supply Co., Fifth and Lander streets, has let contract to H. E. Carlbom, at $75,000 for a new plant for which priorities have been allowed. Building will be 120 x 220 feet. Isaacson Iron Works will fabricate steel roof trusses.

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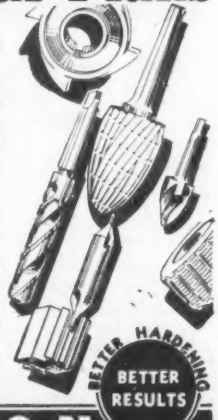

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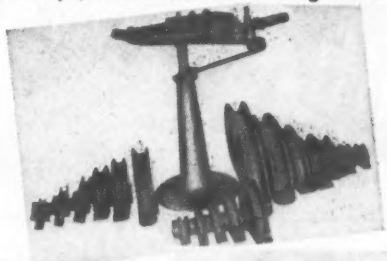

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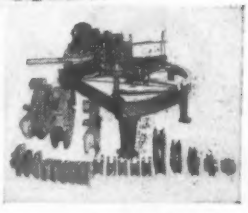

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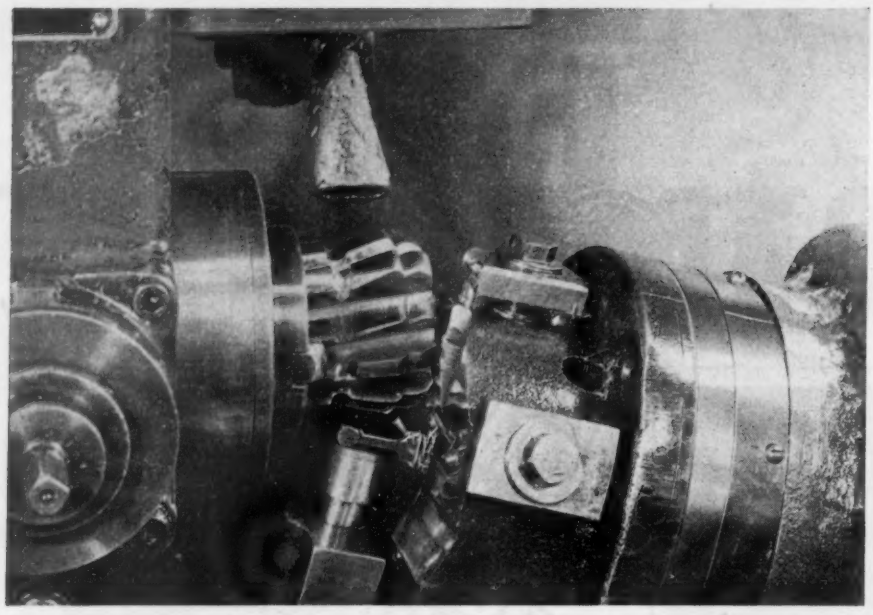

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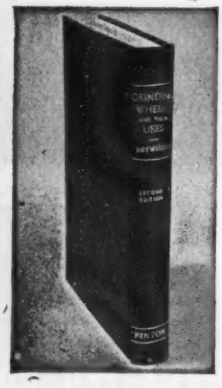

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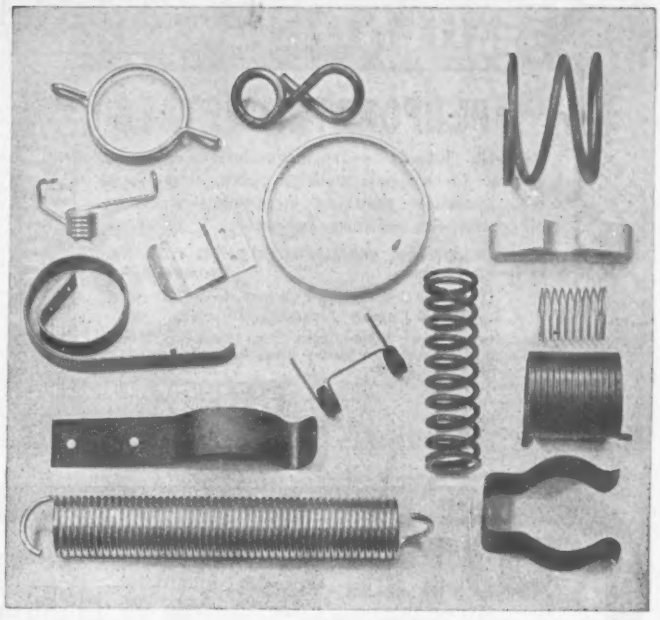

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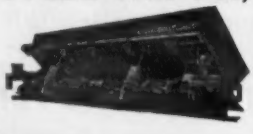

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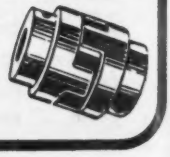

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WANTED POSITION AS CHIEF ENGINEER or Chief Draftsman, by a Registered Engineer, with 23 years experience on all types of structures, such as Buildings, Blast Furnaces, Towers, Grandstands, Steel Stairs, Ornamental Iron, Oil Refinery Structures, Concrete Structures, and Mine Surface Structures. Member of three Engineering Societies and Secretary of Local Chapter for one of them. 41 years old, married and 3 children. Draft classification 4A Reply to Box 997, STEEL, Penton Bldg., Cleveland 13, O.

DEVELOPMENT ENGINEER (M.E.) FIVE years in research department large industrial concern developing new automatic production machinery, additional five years development work on mechanical and hydraulic presses and automatic container machinery. Experienced in supervision and shop methods. Analysis and theory a specialty. Responsibility essential. Age 33. Address Box 103, STEEL, Penton Bldg., Cleveland 13, O.

PURCHASING AGENT, 44, HAVING 15 YEARS' experience purchasing for an industrial organization with fully equipped machine shop and bronze foundry. Would like to form new connection with a progressive concern having good postwar prospects. Eastern location preferred. Address Box 111, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS—This advertising service of 35 years' recognized standing negotiates for high salaried supervisory, technical, and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Send for details. R. W. BIXBY, Inc., 110 Delward Bldg., Buffalo 2, N. Y.

Help Wanted

Foundry Maintenance Superintendent

Wanted

Must be thoroughly familiar with foundry maintenance, all phases. Prefer man with conveyor experience. Southern Location, excellent opportunity. Good salary and working conditions for right man. In replying give complete details of experience, salary requirements, furnishing names of three references. Address Box 100, STEEL, Penton Bldg., Cleveland 13, O.

DESIGNER, DRAFTSMAN AND ESTIMATOR WANTED

Must have full knowledge of construction of all types pressure vessels, storage tanks, general steel plate construction. Plant located in Alabama. Statement of availability required and prefer young engineer. Address Box 998, STEEL, Penton Bldg., Cleveland 13, O.

SUPERINTENDENT

Well established heavy industry making equipment for cutting and forming sheet metal has opening. Give details of education, personal qualifications and work history in letter of application which will be held in confidence. Employment in accordance with existing W.M.C. regulations. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

WANTED PATTERN FOREMAN

Malleable Foundry in Texas has an excellent opening for a man capable of taking charge of wood and metal pattern shop employing twelve to fifteen pattern makers and apprentices, make own layouts and estimate pattern costs. Applicant should state age, family status, salary expected, past and present employers. Address Box 910, STEEL, Penton Bldg., Cleveland 13, O.

CHEMIST WANTED. MUST HAVE EXPERIence in making up charges for air furnace and have knowledge of general air furnace operation in the making of all types of iron rolls. Duties will include the specifying of air furnace heats and general supervising of melting practice. Excellent opportunities for postwar development. Reply to Personnel Manager, Ohio Steel Foundry, Lima, Ohio.

CHIEF ENGINEER, BIRMINGHAM BRANCH Leading bar fabricators. Must be capable of taking complete charge of designing, estimating, detailing and scheduling of reinforcing. Reply with full details to Box 1152, Birmingham, Alabama.

SALESMEN WANTED

Salesmen with trade acquaintance, make $100 day selling surplus listings! Part—full time. War Surplus Reporter, 20 East Jackson Street, Dept. 4, Chicago.

CLASSIFIED

Help Wanted

WANTED
PRODUCTION MANAGER

Man experienced in planning, scheduling, machine loading and inventory control with experience in small lot production. Machine shop and sheet metal experience an asset. Excellent postwar prospects with an old organization in the Middle West.

Address Box 964
STEEL, Penton Bldg., Cleveland 13, O.

Wanted
ELECTRIC FURNACE OPERATORS

In Los Angeles steel foundry. Good opportunity for dependable man. Postwar work assured. Write giving full details including when available. Address Box 881, STEEL, Penton Bldg., Cleveland 13, O.

WANTED—CARBIDE TECHNICIAN. WELL-known eastern company with established sales outlet has excellent opportunity for Chief Technician to develop carbide line, especially for wear resistant applications. Fundamental processing equipment installed. Company also interested in cast tool developments, precision and centrifugal castings, with particular reference to special heat resisting applications, such as gas turbines. State age, education, experience, salary desired and draft status. Address Box 903, STEEL, Penton Bldg., Cleveland 13, O.

WORKS MANAGER

Well established heavy industry making equipment for cutting and forming sheet metal has opening. Give details of education, personal qualifications and work history in letter of application which will be held in confidence. Employment in accordance with existing W.M.C. regulations. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

WANTED — SALESMAN. LONG ESTABlished steel foundry making both large and small castings has permanent position open for salesengineer, to cover Ohio and Indiana territory. Applicant should give personal history, qualifications and experience. Address Box 113, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: ARCHITECTURAL, MECHANICAL, Structural and Electrical Draftsmen. Men experienced in steel mill construction preferred. Have openings for detailers, designers and checkers. Write, Engineering Department, Great Lakes Steel Corporation, Ecorse, Detroit 18, Michigan.

Help Wanted

MECHANICAL ENGINEER

Experienced on the design of light Rolling Mill Machinery or similar equipment—Capable of assuming responsible charge of work and supervising the work of others.

Call for personal interview or give full information in first letter of reply including salary expected. Address J. F. Stadelman.

TAYLOR-WILSON
MANUFACTURING COMPANY
Thomson Avenue
McKees Rocks (Pittsburgh District) Pa.

SALES ENGINEER

Must be familiar with Steel Plate Work and Pressure Vessels. To represent a modern fabricating plant in Virginia, serving the oil, chemical and similar industries. Give full experiences, references and salary expected. Address Box 112, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: ROLLED FORMING MACHINE Technician. Established manufacturer of Decorative Metal Mouldings, located in western Pennsylvania, requires technician for new rolling department. Must be capable of installing and handling production designing rolls, set up and try out, to roll aluminum, cold rolled steel and stainless steel mouldings. Please state experience in detail and personal history and capabilities. All inquiries will be held strictly confidential. Address Box 110, STEEL, Penton Bldg., Cleveland 13, O.

SHOP SUPERINTENDENT WANTED BY sheet steel pipe and plate fabricating plant located in California, normally employing around 40 men. Man with engineering education and experience in steel plate shopwork preferred. Permanent position. Address Box 107, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: MAN WITH GENERAL OFFICE or field sales experience by large reputable manufacturer of seamless and electric welded tubing, alloy and carbon steels. Please apply giving full information, experience, etc., to Box 754, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

WE WANT
MECHANICAL ENGINEERS
MACHINE DESIGNERS
DRAFTSMEN

Men who are capable of carrying the responsibilities involved in the creation, design, development and production of new postwar products consisting chiefly of HEAVY AND LIGHT INDUSTRIAL MACHINERY for absorption of the expanded manufacturing facilities of our plants, now engaged in the production of Army tanks, tank parts, power units, resistance welders, etc. Only persons with well founded practical and technical experience should apply. Permanent positions at good salaries and opportunities for advancement in a growing organization are possible to those who qualify. All replies confidential. Address J. F. Joy, Vice President—Engineering. The Federal Machine and Welder Company, Warren, Ohio.

WANTED
STRUCTURAL STEEL ESTIMATORS

By large structural steel fabricator. Previous experience desirable but not essential. Draftsman, structural detailers or those able to read blue prints urged to reply. Southern location. These are not temporary or duration openings. Address Box 993, STEEL, Penton Bldg., Cleveland 13, O.

AIR FURNACE MELTER WANTED. TO take charge of one 20 ton air furnace making all types of grain, chill type, etc., iron rolls. This position offers excellent future for man with proper experience. Write for interview giving age and previous iron roll melting experience. Reply to Personnel Manager, Ohio Steel Foundry, Lima, Ohio.

ENGINEERS! SPECIALISTS IN VARIOUS fields to work on fee basis. Important research organization requires outside assistance. State qualifications, specialty, background and references. Address Box 108, STEEL, Penton Bldg., Cleveland 13, O.

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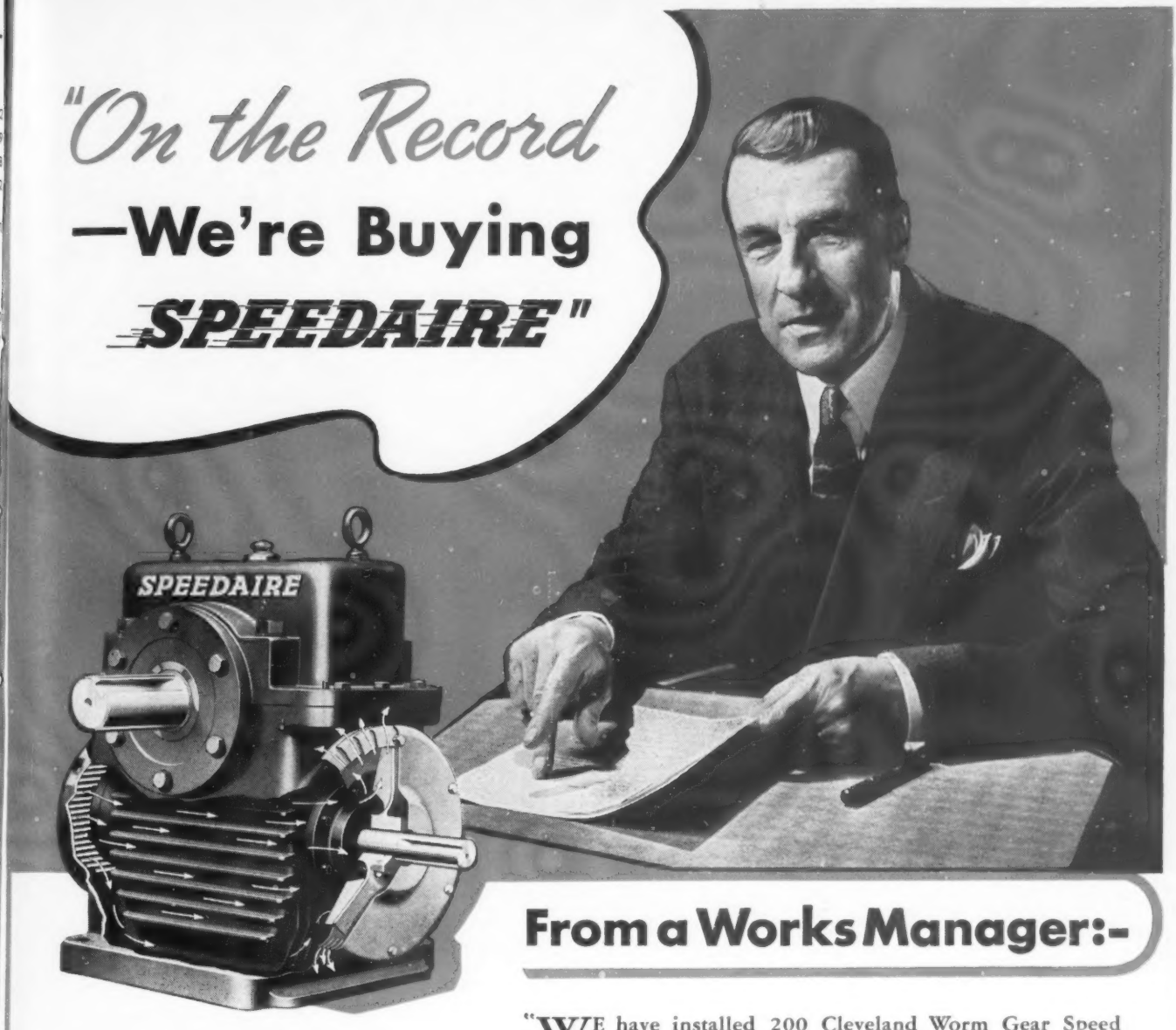

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"Our card-records show they have operated 24 hours a day whenever needed, delivering dependable power without requiring a dime's worth of maintenance or parts replacement.

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Cleveland has been building Worm Gear Speed Reducers exclusively since 1912. The new Speedaire Unit incorporates all of Clevelands' earlier qualities—adds modern improvements of its own. We shall be glad to send Descriptive Catalog 300.

The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

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In Canada: PEACOCK BROTHERS LIMITED

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- Speedaire can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle Drive.
- Speedaire is furnished in 6 standard sizes —from 3 to 95 H.P.

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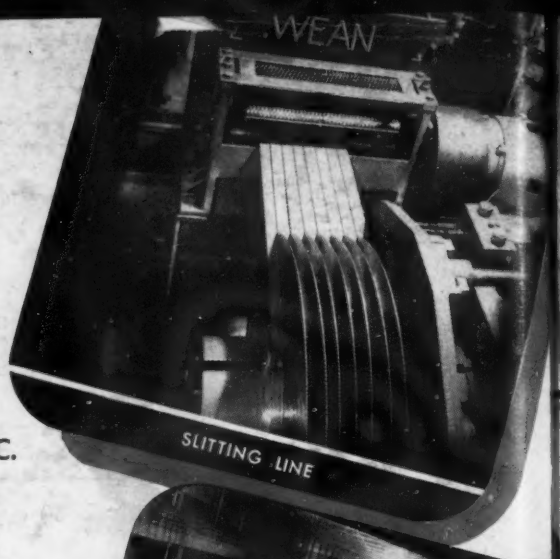
- Narrow Strip and Wire Mill Machinery



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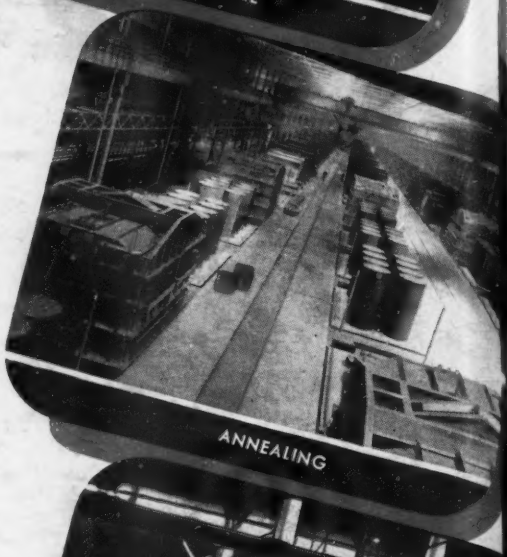
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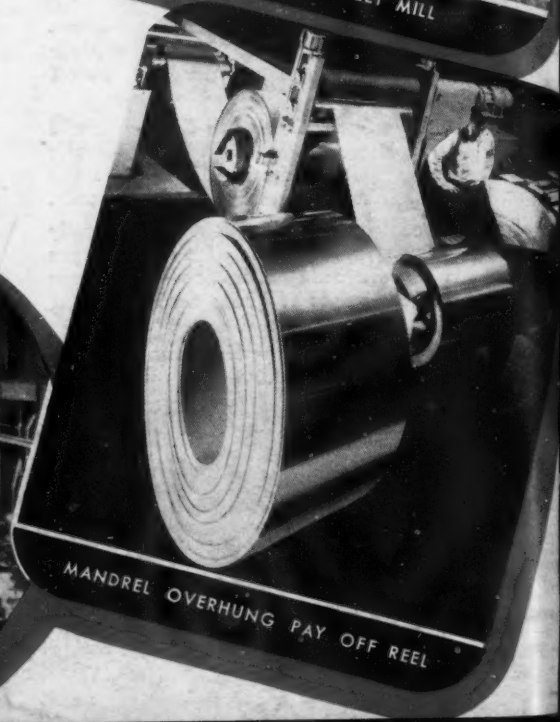
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